Climaveneta **Technical Bulletin**
BWR_MTD2_0011_0121_201110_EN

BWR MTD2

0011 - 0121
5,4 ÷ 33,3 kW

Medium temperature reverse-cycle heat pump, ground source, domestic hot water production

(The photo of the unit is indicative and may change depending on the model)

- Flexibility
- Adaptability
- Hydronic unit assembly
- Optimised for central heating
- Domestic hot water production
- Nadisystem for intelligent control of available energy sources

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This company participates in the Eurovent Certifi cation Programme.
The products are listed in the Directory of certifi ed products.
Eurovent certifi cation applied to units with cooling capacity up to 1500 kW
for air cooled water chillers and water cooled liquid chillers.

Company quality system
certified to UNI EN ISO 9001
and environmental certification
UNI EN ISO 14001

Waiver of liability

This document cannot be considered comprehensive for the purposes of: installation, operation, precautions against risks, handling and transport. See the “General installation manual” for further information.
This document refers to standard configurations, in particular regarding dimensions, weights, electrical, refrigerant, water and air duct connections (where applicable). For further information, drawings and diagrams contact the Climaveneta Sales Office.
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1. DESCRIPTION OF THE UNIT

Brine-to-Water heat pump

The MTD heat pumps, optimised for geothermal systems, are reverse-cycle units that operate in heating, cooling and domestic hot water production modes, using a three way valve (accessory) installed outside of the unit.
The MTD heat pumps can be combined with traditional or radiant systems.
The latter, by working at lower water temperatures, ensure higher overall efficiency and are a very popular solution for new low energy consumption constructions and systems that exploit renewable energy sources.
Installation is very simple: integration of the hydronic unit on the system and source circuits means the unit only needs to be connected to hydronic system and power supply before starting operation.

Ground source solutions

Ground source heat pumps exploit the energy accumulated by the ground, a vast source of heat.
The temperature just a few metres underneath the surface remains constant throughout the year, without the same fluctuations as air temperature.
This means heat can be drawn from the ground in winter so as to supply a heating system at an efficiency of around 400% or higher, or give heat back in summer for cooling, maintaining high efficiency that remains constant all year round.
The same principle can be exploited for domestic hot water production.
Heat is exchanged with the ground via polyethylene pipes that are either laid horizontally in the ground a few metres under the surface, or vertically if there is limited space around the building.
This is a closed loop with heat carrier fluid made up of water and glycol, to prevent the liquid from freezing.

Vertical loop

A vertical geothermal loop allows the heat pump to draw energy from a source at a virtually constant temperature all year round, with considerable benefits in terms of reducing running costs.
This solution requires a small piece of land.
The yield per linear metre of loop in the ground is 50 W/m; this value is used as the reference for standard ground, as described in standard VDI4640. A geologist should always be contacted to verify ground conditions.
Drilling depth is usually around 100 metres (this keeps pumping power down, increasing system efficiency, while deeper bore holes depend on the equipment available locally).
The loops used are double U-bend pipes, PE 100, diameter DN25, DN32 (most common) and DN40.
Depending on heating or cooling capacity required and capacity of the ground, a series of geothermal loops may be used, always leaving a space of 8-10 metres between loops to avoid thermal interference.
The heat yield of the loop and good operation significantly depend on the type of grout used.
Once the PE pipe has been placed in the bore hole, the hole must be filled from the bottom up using a product that guarantees high thermal conductivity and low hydraulic conductivity.
Grout generally consists of mixes of cement and bentonite, where necessary added with silica or quartz sand to increase thermal conductivity, or commercially-available premixed products. This also prevents any interference with underground aquifers that the loop/loops may cross.

Horizontal loop

This solution requires a relatively large piece of land, however costs significantly less than a vertical loop.
Horizontal systems can be made by excavating a field where the plastic pipes will be laid to a depth of around 1-1.5 metres.
Excavation is however costly due to the considerable amount of soil handled. To reduce costs, rather than excavating the loop field, trenches can be dug for laying the heat exchange pipes. In this case, the geothermal loop will be long and narrow.
Currently the most widespread trench systems are slinky loops, either 2-pipe or 4-pipe circuits, laid at a depth of around 2.5-3 metres. In this case, as the loop is laid near the surface, PE 80 pipes can be used, diameter DN25 or DN32.
The amount of heat that can be drawn using these types of solutions ranges from 10 to 15 W/m2, and even higher if there is surface water.
These values are however also affected by variations in air temperature. On average, the geothermal field should be two to three times larger than the surface area being heated.

COMPOSITION OF STANDARD UNIT

Structure

Load-bearing base and structure made from suitably thick hot galvanised steel plate. All parts painted with polyester power coat.

Panelling

External casing made from suitably thick hot galvanised steel plate, painted with polyester power coat, designed to allow total access to inside components. All the panels are covered with high density soundproofing material. Soundproof panelling made from special open-cell cone-shaped sandwich panels on the outside with filler material on the inside, total thickness 35 mm.

Compressors

Hermetic rotary scroll compressors, complete with sump heater, electronic thermal overload protection with centralised manual reset, and two-pole electric motor.
High density rubber soundproof covering.

Utility-side and Source-side heat exchanger

Braze welded AISI 316 steel plate heat exchanger. The heat exchangers are lined on the outside with a layer of closed-cell neoprene to prevent condensation. When the unit is not operating, the heat exchangers are protected against no flow conditions by a water differential pressure switch. The unit is also ready to operate using non-freezing mixes and with an electric heater for frost protection.

Refrigerant circuit

Main components in the refrigerant circuit:
- refrigerant R410A
- dewatering filter,
- liquid flow indicator with moisture signal,
- thermostatic valve with external equaliser,
- high and low safety pressure switches,
- liquid receiver,
- 4-way reversing valve.

System water circuit

Main components in the system water circuit:
- circulating pump
- water differential pressure switch
- expansion vessel
- system vent
- drain valves
- safety valve
- threaded male fittings

Source water circuit
Main components in the source water circuit:
- source pump
- water differential pressure switch
- system vent
- drain valves
- threaded male fittings

Power and control electrical panel
Electrical control panel built in compliance with EN 60204-1/IEC 204-1, complete with:
- main door lock disconnect switch,
- thermal cut-out switches and contactors for the compressors,
- remote ON/OFF terminals,
- remote keypad connection terminals,
- manual summer-winter changeover terminals,
- terminals for connecting system and ground source flow switches,
- alarm signal terminals, / secondary pump / dehumidifier,
- compressor start-up signal terminals,
- outside air temperature sensor terminals,
- outlet electric heater or boiler terminals
- DHW storage electric heater terminals
- electronic controller,
- phase control boards for managing modulating pumps,
- safety fuses,
- compressor start capacitor (single-phase units only),
- IP54 index of protection,
- electrical panel for outdoor installation, with two doors and gaskets
- numbered control circuit cables,
- phase sequence control relay
- pump enabling relay,
- terminals for three-way valve and DHW storage temperature sensor
- remote COOL/HEAT terminals,
- peak limiter for single-phase units only

VERSIONS AVAILABLE
BWR MTD2 Reverse-cycle ground source heat pump with domestic hot water production. Built-in water circuit assembly and peak limiter for single-phase units.

SUPPLIED AS STANDARD
- N-THC remote control complete with backlit display, temperature probe, humidity probe, knob and 4 buttons (must be installed)
- Outside air temperature probe for climate compensation (must be installed)
- Domestic hot water probe
- Storage tank probe
- Rubber vibration dampers

ACCESSORIES
- N-THC wired room timer thermostat with backlit display, complete with temperature and humidity probe for system configuration.
- N-EM1 expansion module for system configuration.
- 3-way selector valve for domestic hot water production.
- Supplementary electric heater for the heating system.
- DHW storage electric heater, as supplementary heat source and for Legionella prevention.
- N-CM kit for managing heat pumps in cascade.
- N-RS RS485 serial card for ModBus protocol.
- Low-loss header, 35, 100 or 200 litres.
- Domestic hot water cylinder, 300 or 500 litres.
- Domestic hot water storage tank, 300 litres, to be combined with the DOMH2O instant domestic hot water production kit.
- Domestic hot water storage tank, 300, 500 and 1000 litres with solar heating coil, to be combined with the DOMH2O instant domestic hot water production kit.
- DOMH2O15 and DOMH2O24 instant domestic hot water production kit.

2. ELECTRONIC CONTROLLER

The NADISYSTEM electronic controller is based on an innovative and efficient approach to building air-conditioning.
Energy is only consumed when necessary and the energy sources are used based on availability, efficiency and cost, giving priority to renewable sources, where available.
The first significant advantage of introducing a single integrated control system is optimisation of energy savings through coordination between the different system components, eliminating inefficiencies in communication, simplifying installation and reducing the number of controllers.
NADISYSTEM ensures dynamic control of water outlet temperature according to real needs in the building and the outside air temperature, optimising comfort and reducing wasted energy.
The remote keypad supplied with the unit can be used to freely set the room temperature, humidity, operating mode, domestic hot water production and operating times for each zone.
The NADISYSTEM control system for residential applications gives high operating flexibility by controlling the secondary circuits, that is, activating zone pumps and valves depending on the room temperature set on the remote keypad, and by controlling mixing valves to ensure the correct water temperature in radiant systems according to the climate conditions set for each circuit.
There are 15 different types of pre-configured system for quick and easy installation, with the possibility to manage up to 5 remote keypads for controlling thermal load in likewise zones.
The advanced PRANA controller also allows integration of solar panels for the domestic hot water production, giving priority to direct solar energy, if available, and increasing the use of renewable sources while also managing traditional sources, such as electric heaters or boilers.
The controller can manage up to four 4 heat pumps connected in cascade to increase capacity in applications with multiple occupied areas, such as hotels, schools, apartment blocks, offices and shopping centres.
The units are managed in master-slave mode, with the master unit responsible for processing the information and sending it to the slave units.
This ensures fine control over the capacity delivered, without decreasing performance, and more precise system sizing.
NADISYSTEM can determine how many cascaded units are needed to guarantee domestic hot water production, all or just one, according to requirements.
The controller also balances compressor operating hours based on time logic, activating the units in rotation, and where necessary excluding any units that are momentarily out of service, without interrupting operation of the cascade as a whole.
NADISYSTEM also allows easy service, being interfaceable to supervision systems for remote maintenance by specialist technicians, as well as remote control of certain functions, such as:
la remotazione di alcuni comandi come:
- on/off
- cooling/heating operation
- heating system/domestic hot water priority
- shutdown due to electricity rate

Main functions

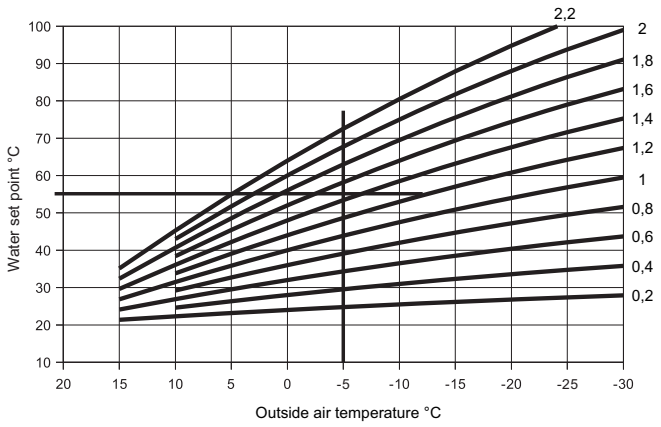
- Wired remote keypad with backlit display, complete with temperature and humidity probe
- Calculation of dew point and increase in water outlet temperature for underfloor systems, possibility to enable a dehumidifier
- Operating parameters with dedicated user and installer menus to configure the type of system
- Weekly timer for setting 6 daily time bands
- Outside air temperature probe to control the system water temperature set point based on heating and cooling compensation curves. Fixed point operation also available.
- Cooling, heating operating modes, automatic mode changeover
- Domestic hot water production
- Supplementary electric heater management for domestic hot water storage and Legionella prevention cycle
- Domestic hot water recirculation by timer or flow switch
- Auxiliary resources management
- Cascaded management of up to 4 heat pumps
- Different systems solutions by configuring the controller and using dedicated expansion modules (accessories), up to 5 zones with the possibility to control different temperature according to the selected compensation curves.
- Alarm signals
- Frost protection management based on inside or outside air temperature or water temperature, to protect the system pipes and heat exchangers inside the unit.

3. OPERATING CHARACTERISTICS

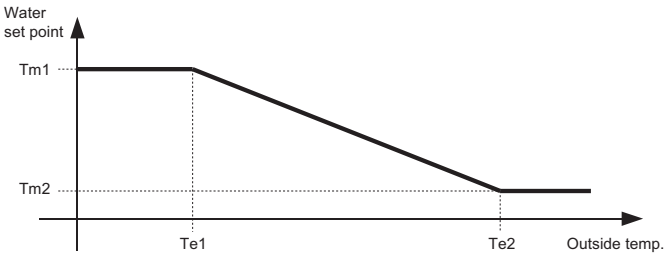
TEMPERATURE CONTROL

The water temperature delivered to the heating and cooling circuit is calculated by the controller and depends on the selected cooling and heating compensation curve.
A building's thermal requirements do not remain constant throughout the day or the year, but rather increase or decrease based on the outside air temperature.
It's therefore a waste of energy to keep the water at a constant temperature. Delivering water at different temperatures to the terminals based on the outside air temperature achieves high seasonal efficiency ratios and brings considerable savings in running costs.
The compensation curve in heating and cooling mode can be adjusted to allow correct heat pump operation according to the system (radiant panels, radiators, fan coils).
Example: Selecting heating curve 1.4 with an outside air temperature of -5°C gives a water temperature of +55°C.
Dedicated compensation curves can be set for each zone, depending on the type of terminal unit, or alternatively a fixed point temperature can be selected.
A function called "room temperature influence" is available to quickly adapt the water temperature by modifying the compensation curve when the indoor conditions change, for example when there are more occupants in the room.
This function is only available in heating mode.
In cooling operation during summer, the controller calculates the dew point using temperature and humidity probe on the remote terminal, which determines an increase in the water temperature to deliver to the radiant system and activation of the dehumidifier (one dehumidifier contact only for all zones).

Heating compensation curve

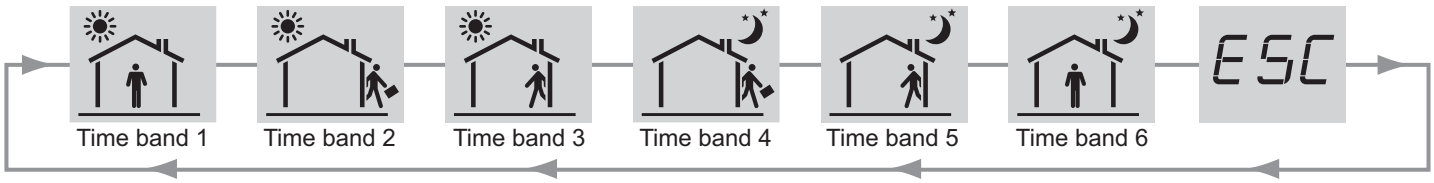


Cooling compensation curve



PROGRAMMING THE TIME BANDS

A timer is available to customise differentiated activation and deactivation for each individual zone of the system, creating an operating profile with up to 6 daily time bands.



SYSTEM PUMP OPERATION

When reaching the system water temperature set point, the compressor stops and the system pump is activated periodically, so as to minimise energy consumption and ensure correct measurement of the water temperature.
The pump on and off times can be set using a parameter, according to the type of system.
In systems with fan coils, the time between one sniffing cycle and the next should be reduced in order to avoid excessive cooling of the water, in heating operation, and if and if the system water content is equal to the minimum value shown in the paragraph on "Minimum and maximum system water content".

SOURCE PUMP OPERATION

The BWR unit's electronics can manage condenser or evaporator operation precisely and reliably, controlling the flow of water through the heat exchanger by modulating operation of the ground source pump.
The condensing/evaporating pressure is read by a dedicated sensor installed on the unit; the electrical signal is then sent to the electronic controller that, based on the configuration parameters, modulates operation of the ground source pump by adjusting power supply voltage.

DOMESTIC HOT WATER PRODUCTION

The controller manages domestic hot water production using a 3-way valve installed outside of the unit, deviating the flow of hot water to the DHW storage tank, which must be suitably sized according to the type of usage.
Production is enabled when the water temperature inside the DHW storage tank (probe BT8) is less than the DHW set point.
The production of domestic hot water is guaranteed in both summer and winter, according to the operating limits shown in this manual.
If heat pump operation is expected outside of the limits, consider using a supplementary source of heat, managed directly by the controller.
An electric heater should be installed inside the DHW storage tank to ensure the temperature does not fall below 10°C in the event of extended periods of heat pump inactivity (standby).

LEGIONELLA PREVENTION FUNCTION

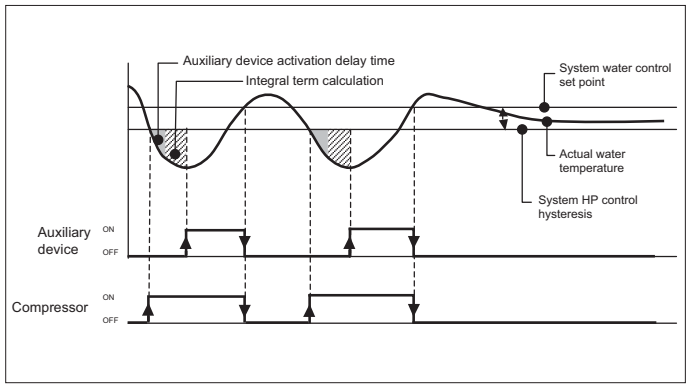
The Legionella prevention function ensures the elimination of the Legionella bacteria that reside in domestic water storage tanks.
The temperature and duration of the Legionella prevention cycles to eliminate bacteria are typically:

- 2 minutes > 70°C
- 4 minutes > 65°C
- 60 minutes > 60°C

The Legionella prevention cycles are managed directly by the controller, enabling the heater in the domestic hot water storage tank domestic, with the possibility to set the duration, temperature, day and time.

AUXILIARY RESOURCES

The controller can manage devices outside of the heat pump, such as electric heaters or boilers.
The auxiliary device can be used to replace or supplement heat pump operation, as selected by parameter.
In the first case, the external device is activated to replace the heat pump during operation outside of the limits shown in paragraph 6, "Operating limits", or alternatively if the compressor shuts down due to a fault.
In supplementary operation, the external device is activated at the same time as the compressor so as to satisfy the building's thermal demand, based on the trend in water temperature, as shown in the graph.



SYSTEM MANAGEMENT

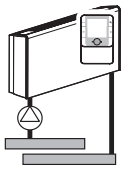
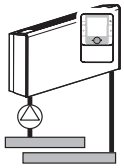
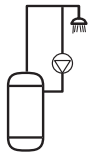
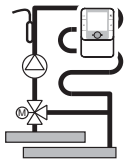
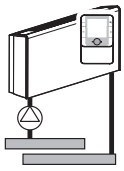
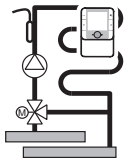
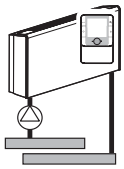
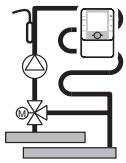
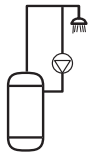
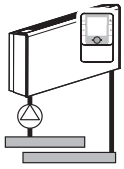
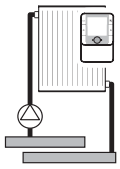
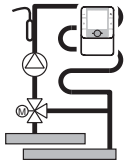
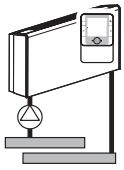
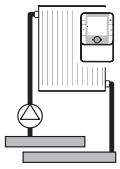
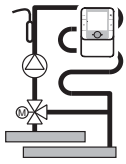
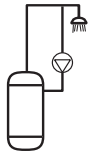
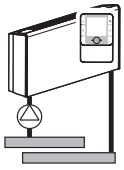
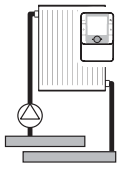
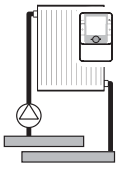
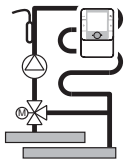
The NADISYSTEM control system for residential applications gives high operating flexibility by controlling the secondary circuits, that is, activating zone pumps and valves depending on the room temperature set on the remote keypad, and by controlling mixing valves to ensure the correct water temperature in radiant systems according to the climate conditions set for each circuit.

There are 15 different types of pre-configured system for quick and easy installation, with the possibility to manage up to 5 remote keypads for controlling thermal load in likewise zones.

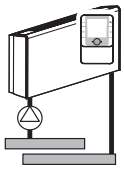
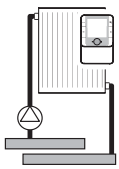
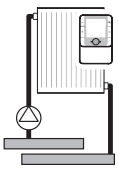
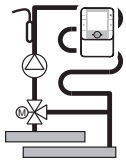
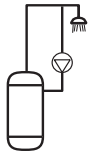
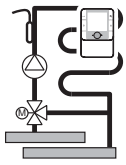
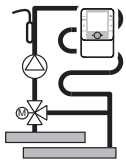
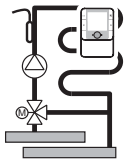
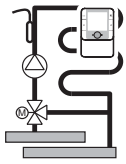
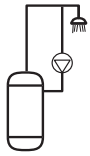
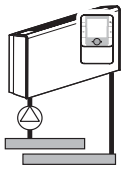
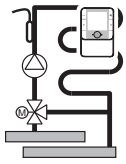
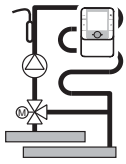
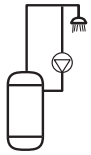
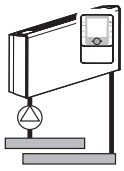
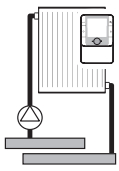
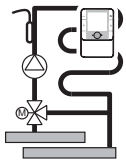
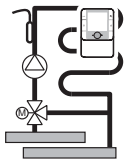
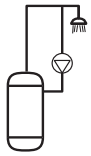
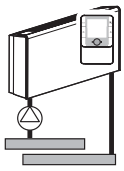
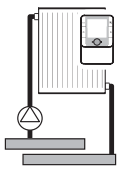
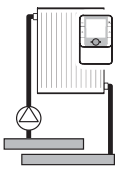
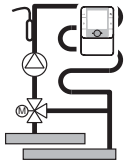
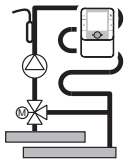
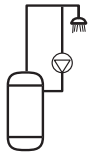
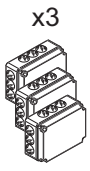
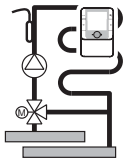
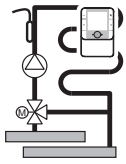
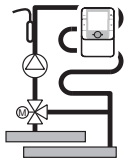
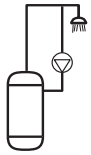
If the radiant system also needs to meet cooling demand, humidity control is guaranteed by activating the dehumidifier contact, while calculation of the dew point, measured by the N-THC controller, ensures the correct water outlet temperature defined by the cooling compensation curve, thus avoiding formation of condensate on the floor.

Remember to suitably insulate the pipes in contact with the air, if air-conditioning in used inn summer.

The following table indicates the different type of systems that can be controlled directly by the NadiSystem.

N. System Configuration	Remote Keypad N-THC	Expansion Module N-EM1	High Temp. Zone (ex. Radiator/ Fan Coil)	High Temp. Zone (ex. Radiator/ Fan Coil)	High Temp. Zone (ex. Radiator/ Fan Coil)	Low Temp. Zone (ex. Floor Heating)	Low Temp. Zone (ex. Floor Heating)	Low Temp. Zone (ex. Floor Heating)	DHW Recirculation
0	x1 standard								
1	x1 standard	x1							
2	x1 standard	x1							
3	x1 standard + x1 optional	x1							
4	x1 standard + x1 optional	x2							
5	x1 standard + x3 optional	x2							
6	x1 standard + x3 optional	x2							
7	x1 standard + x3 optional	x2							

The controller can manage the valves in each individual zone or alternatively pumps, depending on the set temperature.
The system decides whether to activate the unit or the most energy efficient resources to meet demand.
NadiSystem manages different temperature levels based on the terminal units used.
The heat pump directly produces water at the right temperature for the system terminals connected to the high temperature circuits (e.g. fan coils, radiators, towel rails in bathrooms), while low temperature radiant panels are controlled by the mixing valves according to the specific compensation curves.
This means a compensation curve can be applied to the high temperature zones and different compensation curves for each low temperature zone (maximum three).
Depending on the type and complexity of the system, expansion modules are required for connection of the components managed by the system (pumps, valves, probes etc.), as indicated in the table.
Simple installation by serial connection of the components making up the NadiSystem.

N. System Configuration	Remote Keypad N-THC	Expansion Module N-EM1	High Temp. Zone (ex. Radiator/ Fan Coil)	High Temp. Zone (ex. Radiator/ Fan Coil)	High Temp. Zone (ex. Radiator/ Fan Coil)	Low Temp. Zone (ex. Floor Heating)	Low Temp. Zone (ex. Floor Heating)	Low Temp. Zone (ex. Floor Heating)	DHW Recirculation
8	x1 standard + x3 optional	x2							
9	x1 standard + x1 optional	x2							
10	x1 standard + x1 optional	x2							
11	x1 standard + x2 optional	x2							
12	x1 standard + x3 optional	x3							
13	x1 standard + x4 optional	x3							
14	x1 standard + x2 optional	x3							

Key

- Mixing valve floor heating
- Circulation Zone pump or motorized valve
- Water probe
- DHW pump circulation
- Ambiente thermostat

* N.1 ambiente thermostat available with the heat pump
** Configurations from 4 to 14 are required additional N-THC as accessories

FROST PROTECTION

The frost protection function is active even when the heat pump is OFF.

DOMESTIC HOT WATER FROST PROTECTION STORAGE

The domestic hot water frost protection function is only active if an auxiliary resource is installed for the domestic hot water storage tank.
The additional heater is activated if the water temperature, measured by sensor BT8, is less than +5°C, and is deactivated at +8°C.

PRIMARY CIRCUIT FROST PROTECTION SYSTEM

The frost protection function is guaranteed by activating the electric heater on the heat exchanger and the system pump. The pump and the electric heater are activated if the water temperature (measured by the probe at the heat exchanger outlet) is less than 4.5°C and deactivated when the water temperature reaches +7°C.
Frost protection active for the system and source heat exchanger. Frost protection on the source circuit is activated when the water temperature is less than -4.5°C.

SECONDARY CIRCUIT FROST PROTECTION SYSTEM

The pumps on the system's secondary circuit are activated together with the primary pump, according to the criterion described in the previous paragraph.

FROST PROTECTION BASED ON OUTSIDE AIR TEMPERATURE

The system pump is activated according to the outside air temperature to prevent ice forming in the pipes.
The pump is activated if the outside air temperature is less than 4°C and deactivated when it rises back over 5°C.

FROST PROTECTION BASED ON INSIDE AIR TEMPERATURE

The heat pump and/or supplementary heat sources (outlet heater or boiler) are activated if the inside temperature falls below 14°C, to prevent the pipes inside the home from freezing.

ALARM SIGNALS

Correct unit operation and any alarms are displayed on the room thermostat, the latter by the symbol.
The diagnostics functions include complete alarm management, with an alarm log (via service keypad) for more detailed analysis of unit behaviour.

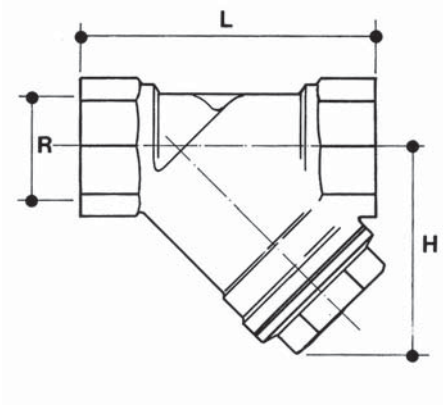
4. ACCESSORIES

The accessories listed below are supplied separately.

METAL MESH WATER FILTER

This filter MUST be installed on the heat pump return pipe to trap any impurities in the water circuit that may damage the unit's heat exchanger.

Characteristics	
Body	Brass
Finish	Sanded
Body gasket	Betaflex 71
Thread	ISO 228/1
Filter	AISI 304 stainless steel micro-perforated sheet metal
Hole pitch	2 mm
Inscribed hole diameter	500 micron
Number of holes per cm^2	80



Dimensions				
DN		32	40	50
R	inch	1 1/4	1 1/2	2
L	mm	96	106	126
H	mm	68	75	90

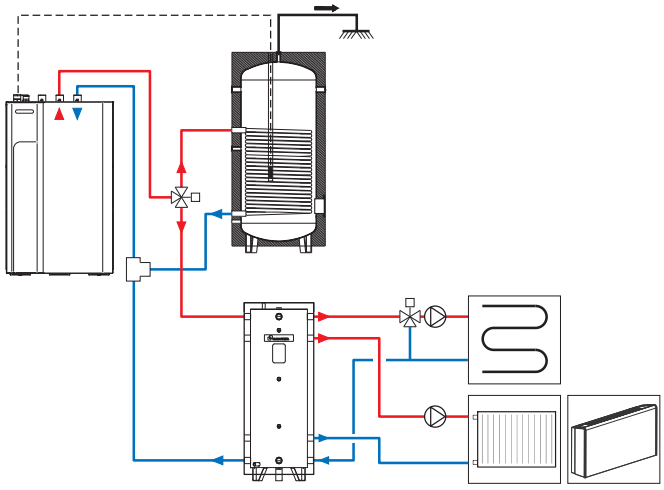
Pressure drop				
R	inch	1 1/4	1 1/2	2
Kv		17	24,5	36

BT AND PT STORAGE TANKS

Storage tanks to be used in heating and cooling systems, to ensure minimum heat pump operating time in all operating conditions and avoid excessive starts and stops. It can also be used to isolate the water circuit from the heat pump and to partially meet energy demand during periods in which the unit is shutdown due to the electricity rate. For indoor installation.

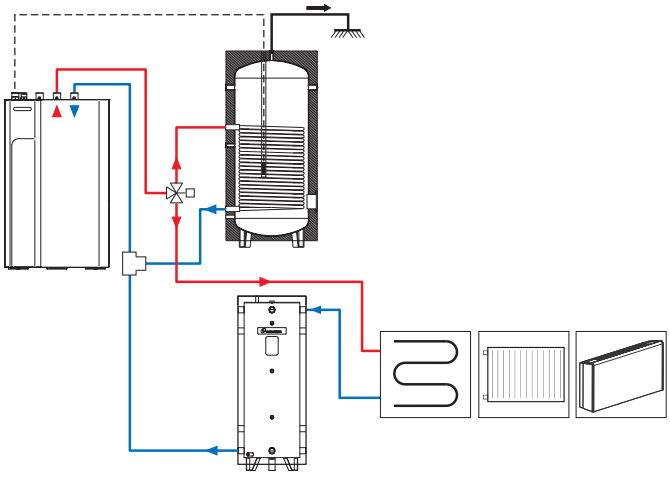
Models available	Volume
BT35	35 litres
BT100	100 litres
BT200	200 litres
TP300	300 litres

The diagram illustrates the use of the BT/TP storage tank as a low-loss header to separate the heat pump primary circuit from the secondary circuit to the terminal units.
This allows different flow-rates and temperatures to be managed depending on the type of terminal used.
Correctly sized, it guarantees the minimum water volume required by the heat pump.



The diagram shown is purely indicative.

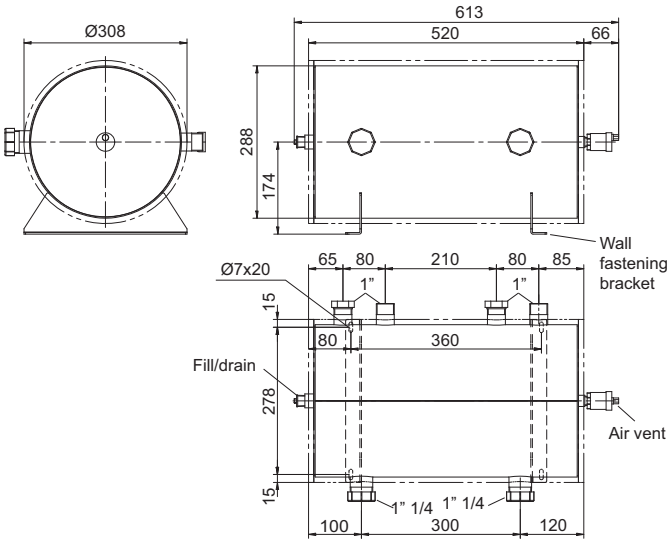
The diagram illustrates the use of the BT/TP storage tank as a storage tank on the heat pump return pipe so as to increase the volume of water available in the system, avoiding excessive starts and stops.
In this case, make sure the available pressure head of the pump on the unit is sufficient to guarantee correct system operation.



The diagram shown is purely indicative.

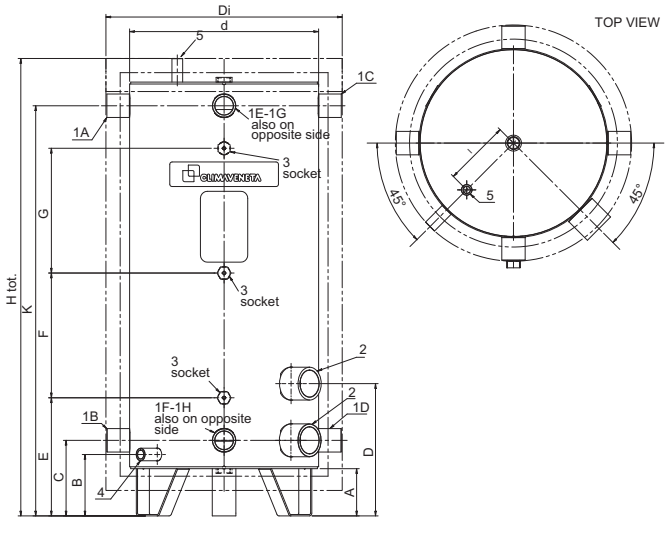
Technical specifications
The storage tanks are made from carbon steel plate welded using the best technology and undergo strict water pressure tests (9 bars, allowing an operating pressure of 6 bars).
Being a container of water for heating and cooling, this product does not require internal treatment, while the outside is coated with rustproof paint.
The tanks are protected on the outside with a closed cell elastomeric foam lining, 50 mm thick, with soft blue PVC exterior finish, for models BT 100/200 and TP300; polyethylene foam insulation, 10 mm thick, with metallic exterior finish for models BT35.

Dimensions - Model BT35



Volume	Storage tank dimensions											
	Di	d	Htot	A	B	C	D	E	F	G	K	I
litres	mm											
100	500	400	970	100	130	160	280	250	264	264	868	140
200	550	450	1410	100	130	160	280	430	374	386	1298	170
300	700	600	1235	100	130	160	280	320	321	332	1133	200

Dimensions - Model BT100, BT200, TP300

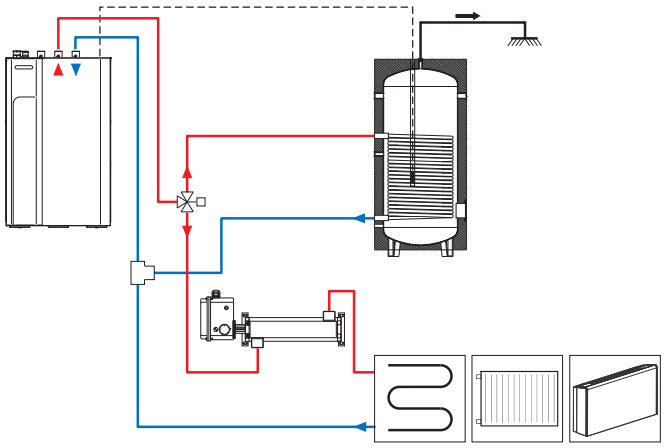


Volume	Fittings				
	1	2	3	4	5
litres	inch				
100	1"1/4	2"	1/2"	1/2"	3/8"
200	1"1/4	2"	1/2"	1/2"	3/8"
300	1"1/4	2"	1/2"	1/2"	3/8"

Pos.	Description
1A	Heat pump outlet
1B	Heat pump return
1C	System outlet
1D	System return
1E- G	Supplementary source outlet
1F-1H	Supplementary source return
2	Electric heater attachment
3	Probe socket
4	Drain/load
5	Vent

OUTLET ELECTRIC HEATER

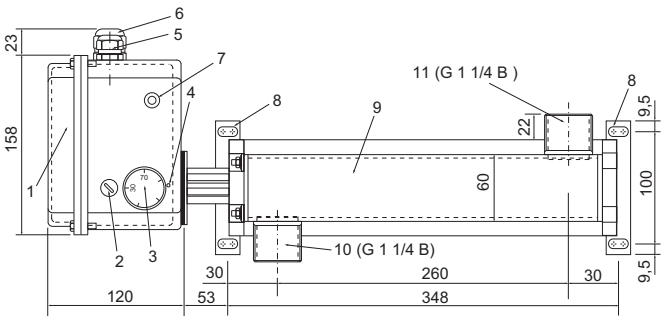
The outlet electric heaters are available with power ratings of 3 kW single-phase and 3, 6 and 9 kW three-phase.
Used on the system outlet, these guarantee the heating demand of the building at low outside temperatures by supplementing the heating capacity of the heat pump.
The electric heaters are deactivated as soon as the heat pump alone can meet heating demand.
Considering that normally the heat pump operates only a short time at low outside temperatures, operation of the supplementary heater is also reduced and consequently power consumption is negligible.
Therefore, the system's seasonal efficiency ratio remains unchanged.
Wall-mounted installation using the fastening brackets.



The diagram shown is purely indicative.

Technical specifications		
Power supply	230V/50Hz	400V/50Hz
Power	3000 W	3000-6000-9000 W
Maximum pressure	6 Bar	
Min/max operating temperature	5...90°C	
Safety thermostat	90 +/- 5°C	
Adjustable thermostat	30...70°C	
Heating element material	Incoloy 800	
Threaded attachment	1" 1/4 M GAS	
Index of protection	IP 55	
Indicator light	Red; on when heater operating	

Dimensions



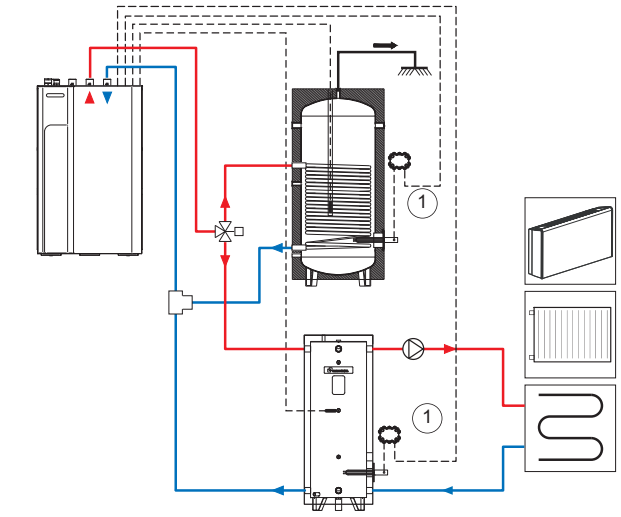
1 Terminal block cover
2 Safety thermostat manual reset
3 Control thermostat knob
4 Reference for knob full scale
5 Cable gland for control cable
6 Cable gland for power cable
7 Red light, on when the heater is operating
8 Wall fastening brackets
9 Heater body
10 Water inlet
11 Water outlet

IMMERSION ELECTRIC HEATER

The single-phase immersion electric heater can deliver 1 kW, 2k W or 3 kW depending on the electrical connections, and must only be used in immersion, via the water connections provided on the HWC storage cylinders or the BT, TP and TPS storage tanks.

The electric heater guarantees Legionella prevention or works to supplement domestic hot water production at low outside temperatures.

If used inside the TP storage tanks it can help meet building heating demand in the event of operation outside of the heat pump operating limits.

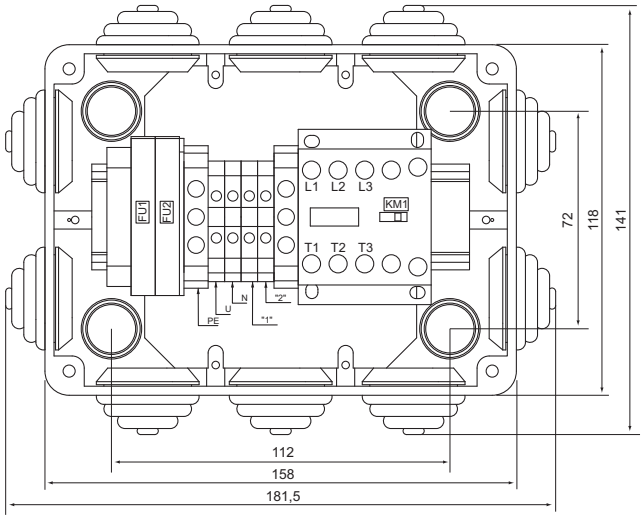


1 Immersion electric heater

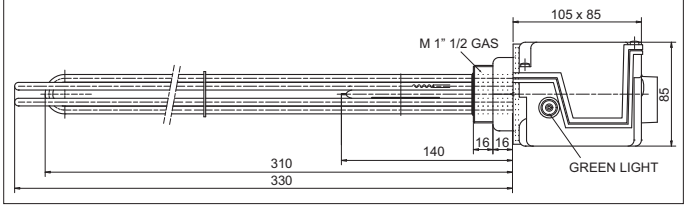
The diagram shown is purely indicative.

Technical specifications	
Power supply	230V/50Hz
Power	1000, 2000, 3000 W (+5%/ -10%); power in relation to the electrical connection.
Maximum pressure	6 Bar
Max temperature, heating area	300°C
Max temperature, seal area	120°C
Adjustable safety thermostat	9….75°C
Heating element material	Incoloy 800
Terminal block protection material	PVC
Threaded attachment	1" ½ M GAS
Gasket	ASBERIT 60*48*3
Index of protection	IP 44
Indicator light	Green; on when heater operating

Dimensions - Electrical panel



Dimensions - Immersion electric heater



1”¼ 3-WAY VALVE FOR DOMESTIC HOT WATER PRODUCTION:

The 3-way valve deviates the flow of water to the domestic hot water storage tank when the temperature read by probe BT8 falls below the set point.
The servomotor is also fitted with an auxiliary contact.
Contact closed when the valve is open and contact open when the valve is closed. The 3-way selector valve for domestic hot water production must have the following characteristics for correct heat pump operation:

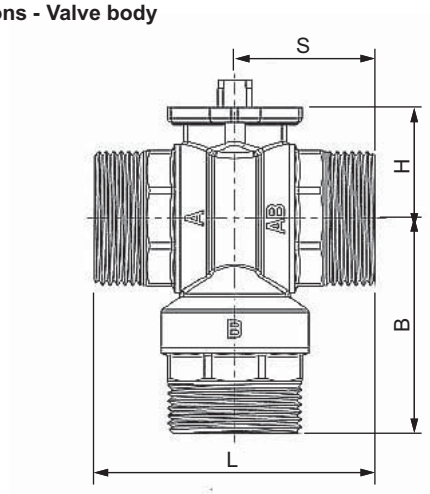
- Voltage 230V AC, 50/60 Hz
- If valve rotation takes more than 10 s, the time can be set by parameter.
- Delta P 500 kPa
- Fluid temperature 0°C to 90°C
- Pressure drop below 20 kPa.

In the total height of the valve (body + servo control) also take into account 40 mm for the extension supplied with the kit, required for correct insulation of the pipes.

Technical specifications - Valve body	
Operating pressure	PN16 for water at 90°C. PN20 for chilled water
Leaks	None
Fluid temperature	Water 0°C to 90°C
Angle of rotation	90°
Thread	Gas UNI ISO 228
Valve body and fitting	Brass OT58, UNI575/65
Stem	Brass
Gasket	PTFE seat, EPDM O-ring
Ball	Chrome-plated brass
Weight	1,28 Kg

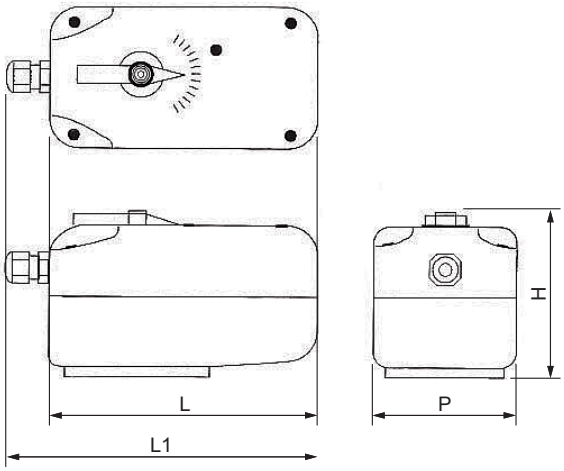
Technical specifications - Servomotor	
Power supply	230VAC, +10% - 15%
Frequency	50Hz
Power consumption	4 VA
Travel time (open/close)	10s
Free auxiliary contact (end travel)	230V - 1A (resistive)
Allowable operating temperature	0 ... + 50 °C
Allowable transport and storage temperature	- 10 ... + 80 °C
Allowable humidity	Class G, DIN 40040
Index of protection	IP 54
Connection cable	6 x1 mm², 0.8 m long
Manual control	manual open/close control
Weight	0,45 Kg

Dimensions - Valve body



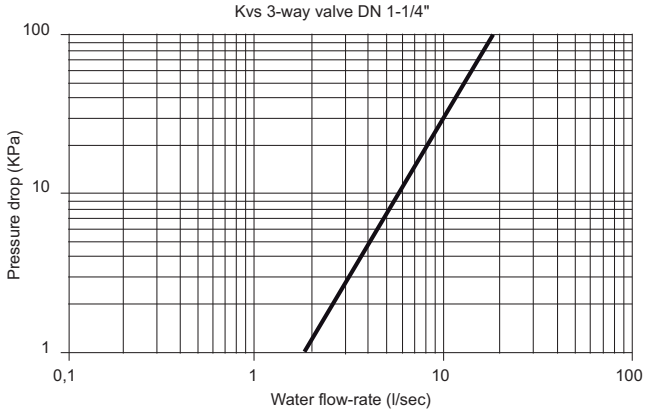
Fittings	inch	1”1/4 G
L	mm	102,6
B	mm	76,8
H	mm	51,3
S	mm	39,8

Dimensions - Servo control



L	mm	131
L1	mm	156
H	mm	75
P	mm	70

Graph of valve pressure drop



HWC DOMESTIC HOT WATER CYLINDER

The HWC storage cylinders are made especially for domestic hot water production in combination with heat pumps, thanks to the inside coil with large heat exchange area.
The heat pump is connected to the inside coil that heats the domestic hot water contained in the storage tank.
Legionella prevention cycles are managed by an electric heater that can be installed in the fitting provided on the flange.
The Legionella prevention cycles are managed by the NadiSystem controller on the heat pump.

Models available	Volume
HWC300	300 litres
HWC500	500 litres

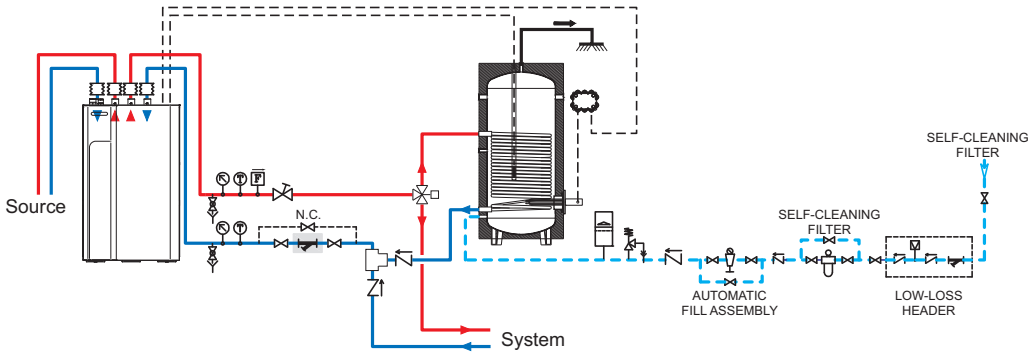
Storage cylinder and heat pump combinations									
Storage cylinder	Coil water content	Coil surface area	Combined heat pumps						
	(l)	(m^2)	11	25	31	41	51	61	91
HWC 300	22,3	3,5	x	x	x			N.A	N.A
HWC 500	38,5	5,9	x	x	x	x	x	N.A	N.A

The combinations proposed exclude the 0061 and 0091 heat pumps, which require the TPS series storage tanks.

Technical specifications

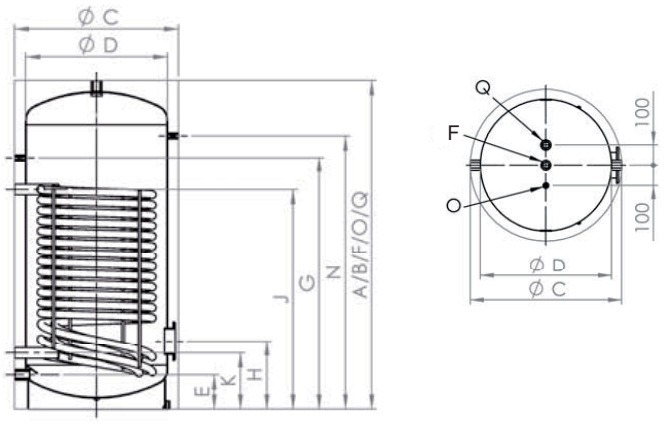
The cylinders are made from S275JR steel plate in accordance with DIN 4753 and undergo strict water pressure tests (9 bars, allowing an operating pressure of 6 bars). Lined on the inside with double layer of enamel in accordance with DIN 4753.
Protection against corrosion guaranteed by the magnesium anode, provided with the accessories supplied as standard with the storage cylinder. The cylinders are protected on the outside by 50 mm rigid CFC-free PUR lining with white skai casing.

Water circuit diagram

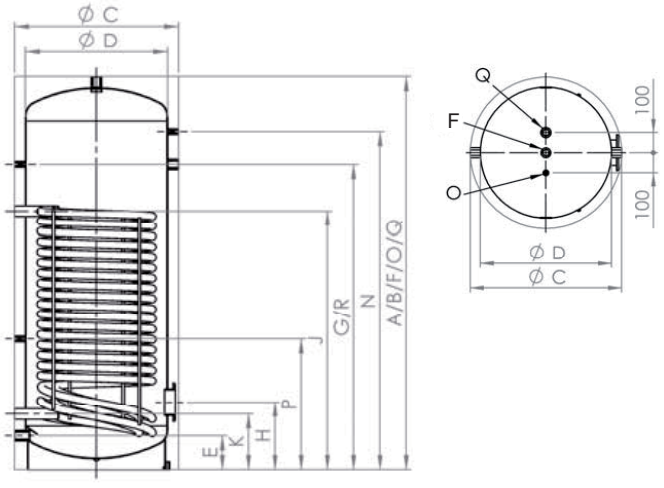


The diagram shown is purely indicative.

Dimensions - Model HWC300



Dimensions - Model HWC500



	Use	Dimensions	300	500
A	Height	with insulation - mm	1570	1800
B		without insulation - mm	-	-
C	Diameter	with insulation - mm	650	750
D		without insulation - mm	550	650
E	Cold water	height - mm	140	155
		fitting - R"	1 ¼"	1 ¼"
F	Hot water	height - mm	1570	1800
		fitting - R"	1 ¼"	1 ¼"
G	Recirculation	height - mm	1200	1400
		fitting - R"	½"	½"
H	Flange with 2" bushing for electric heater	height - mm	295	310
		Ø - mm	180/120	180/120
		fitting - R"	2"	2"
J	Heat pump outlet	height - mm	920	1185
		fitting - R"	1 ¼"	1 ¼"
K	Heat pump return	height - mm	240	255
		fitting - R"	1 ¼"	1 ¼"
N	Thermometer	height - mm	1350	1550
		fitting - R"	½"	½"
O	Probe socket	height - mm	1570	1800
		fitting - R"	½"	½"
P	Probe socket	height - mm	-	600
		fitting - R"	-	½"
Q	Magnesium anode	height - mm	1570	1800
		fitting - R"	1 ¼"	1 ¼"
R	Magnesium anode	height - mm	-	1400
		fitting - R"	-	1 ¼"

Weight with insulation	kg	145	220
Water content heat exchange	l	22,3	38,5
Surface area heat exchanger	m^2	3,5	5,9

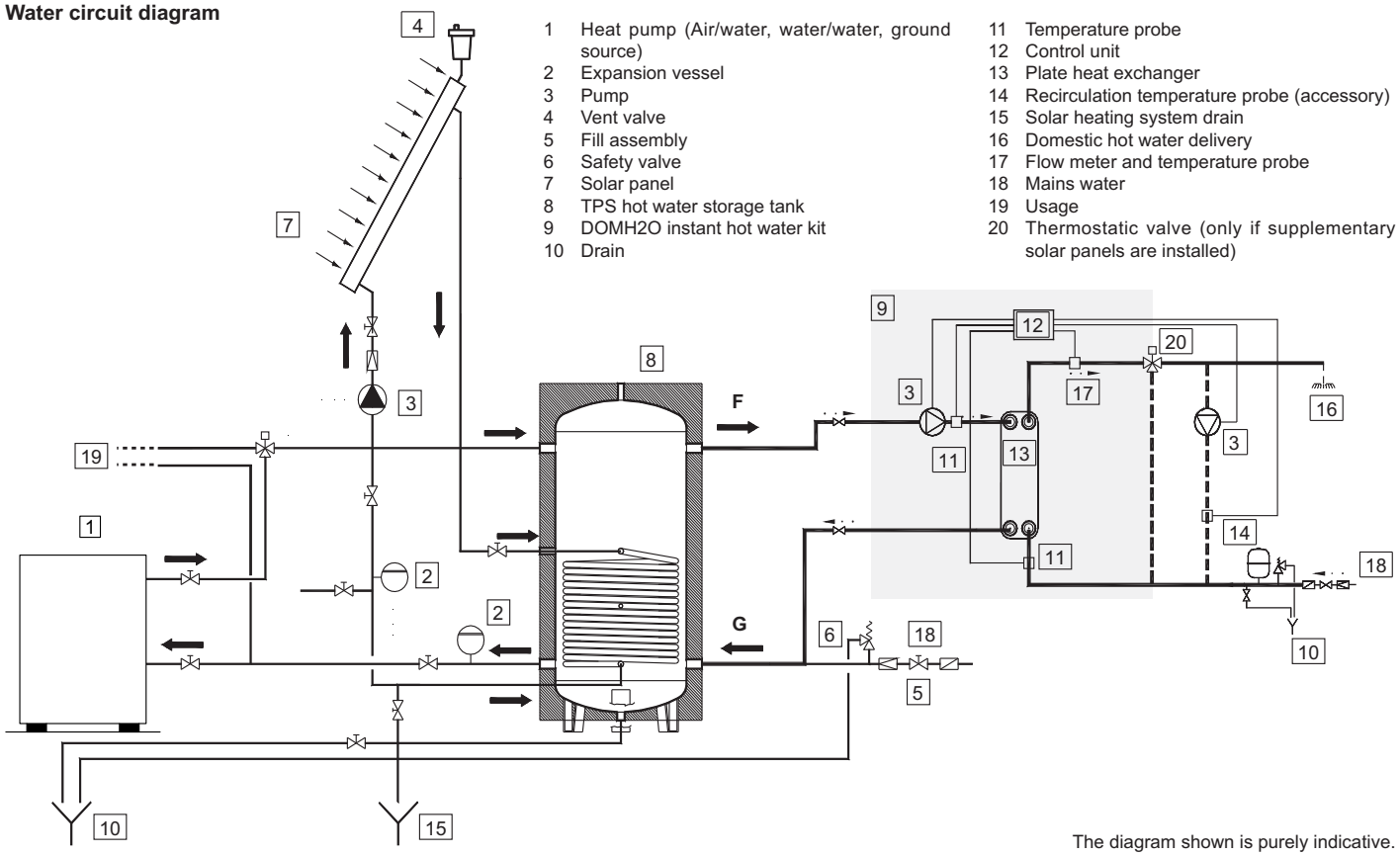
TPS STORAGE TANKS AND DOMH2O INSTANT DOMESTIC HOT WATER PRODUCTION KIT

The TPS storage tank is used to store water heated by a heat pump, and allow further supplementary heat from the solar heating coils fitted inside. In addition, tank connections are also available for other sources of heating, for example gas- or wood-fired appliances. Two electric heaters can be installed using the 2" fittings provided.
Domestic hot water production is guaranteed by the DOMH2O15 and DOMOH2O24 instant kits combined with the storage tanks.
The instant domestic hot water production kit draws energy from the storage tank and via heat exchange with the plate heat exchanger ensures the correct domestic hot water temperature, controlled by modulation of the primary circuit pump.
The control unit with graphic display allows the user to monitor operation, as well as set the set point and operating parameters.

Storage tank model available	Volume
TPS300	300 Litres
TPS500	500 Litres
TPS1000	1000 Litres

Instant domestic hot water production kit model available
DOMH20 15
DOMH20 24

Water circuit diagram



The diagram shown is purely indicative.

Technical specifications

TPS storage tanks

The storage tanks are made from carbon steel plate welded using the best technology and undergo strict water pressure tests (9 bars, allowing an operating pressure of 6 bars).
Being a container of hot and cold water, this product does not require internal treatment, while the outside is coated with rust-proof paint.
The tanks are protected on the outside with a closed cell elastomeric foam lining, 70 mm thick, with soft blue PVC exterior finish.

DOMH2O instant domestic hot water production kit

The instant domestic hot water production kit features the following components:
- AISI 316 stainless steel plate heat exchanger, insulated
- Circulating pump with low power consumption and electronic speed control
- Control unit with graphic display indicating the temperature and heat delivered
- Insulated copper pipes and connectors
- Sheet metal structure and thermoformed RAL panels, wall-mounted installation.

The control unit adjusts the speed of the primary circuit pump to maintain the set domestic hot water temperature, adjustable from 30°C to 65°C. If the domestic hot water temperature leaving the heat exchanger reaches Tmax (between 60°C and 75°C) the primary circuit pump is switched off.
When the temperature falls below the threshold (Tmax) the pump is started again.
For systems with supplementary solar heating, the primary circuit temperature may exceed the maximum limit of 65°C and pump speed modulation may not guarantee the DHW set point.

In this case, a thermostatic valve should be used at the instant domestic hot water production kit outlet to avoid excessive domestic hot water temperatures.
The DHW recirculating pump can be managed (maximum power 185 W) by setting the water temperature in the recirculation circuit.
When the temperature falls below the set point the recirculating pump is activated, and vice-versa.
In addition, on and off times can be set for the recirculation circuit and a custom program created for each day of the week.

Selection guide

To choose the best system made up of storage tank and external instant hot water production unit, the following three parameters need to be verified:

1. Tank volume is sufficient to produce the DHW required by the system.
2. Instant flow-rate of the external unit is higher than peak delivery flow-rate.
3. Storage tank volume is higher than the minimum recommended volume for correct heat pump operation (based on heat output).
   This condition is normally verified as the volume is quite low.

1. Storage tank volume

Tank volume and the characteristics of the primary source (heat output and outlet temperature) are the parameters that determine the amount of water that can be delivered in a certain unit of time. The following equation can be used to size the tank in terms of volume.

$$V = [Wf*(Tout-Tin)/(T0-Tf)] - [(P*tm*1000)/(Cp*(T0-Tf)]$$

Where:

V: Required storage tank volume in litres
Wf: Amount of domestic hot water required in the peak period, in litres
Tm: Duration of the peak period in minutes
T0: Temperature inside the storage tank [°C]
Tf: Minimum usable storage tank temperature [°C]
Tin: Mains water inlet temperature [°C]
Tout: DHW delivery temperature [°C]
Cp: Specific heat of water 4.186 kJ/kg °K
P: Primary source heat output [kW]

2. Instant DHW production

The amount of domestic hot water required at the points of delivery must be less than the amount produced by the unit.
The graphs on the previous pages illustrate the amount of water produced by the units as the primary circuit temperature changes.

3. Thermal inertia

The storage tank, as well as accumulating energy to be used when necessary, also acts as a buffer for the primary source of energy, reducing the number of starts and stops.
The volume of the storage tank must therefore be greater than the value recommended by the manufacturer of the primary source (heat pump or other appliance).

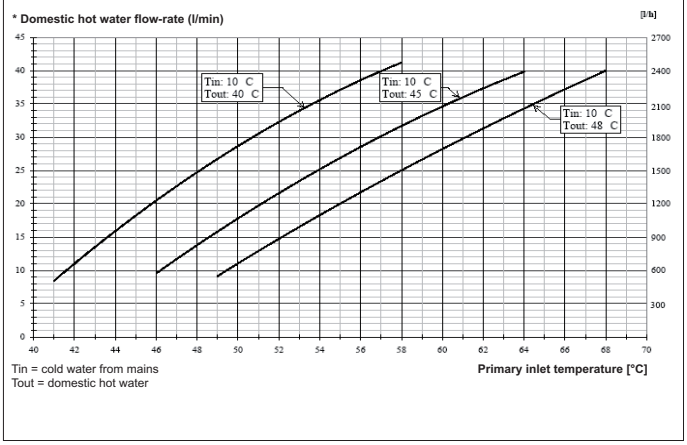
Typical combinations

Below are some combinations for typical residential applications with heat pumps.

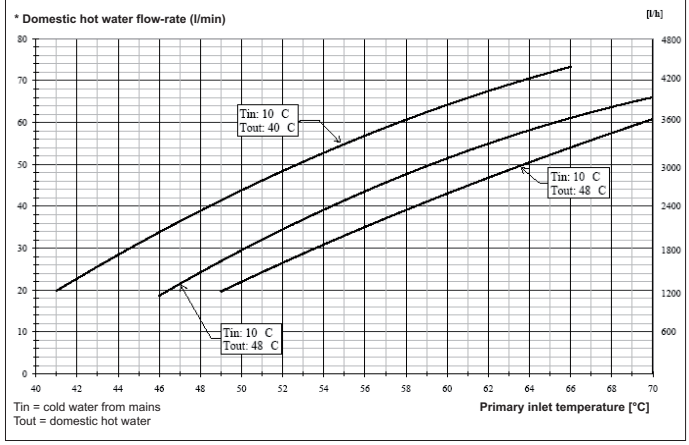
Type of home	no. of people	no. of bathrooms	Heat pump heat output	Storage tank volume	DOMH20 model
Single home	<3	1	4 - 6 kW	300	15
Single home	4 - 5	2	6 - 8 kW	500	15
Single home	5 - 6	2	10 - 13 kW	1000	24
Single home	6 - 7	3	15 - 18 kW	1000	24
2 apartments	4 - 5	2	6 - 8 kW	500	15
2 apartments	7 - 8	5	15 - 18 kW	1000	24
3 apartments	7 - 8	3	15 - 18 kW	1000	24
3 apartments	9 - 12	6	20 - 22 kW	1000	24

The combinations are calculated based on the following peak consumption:
- 60 l per person in single homes,
- 250 l per apartment with one bathroom,
- 350 l per apartment with two bathrooms,
- Simultaneous use factor

DOMH20 15 heating performance



DOMH20 24 heating performance



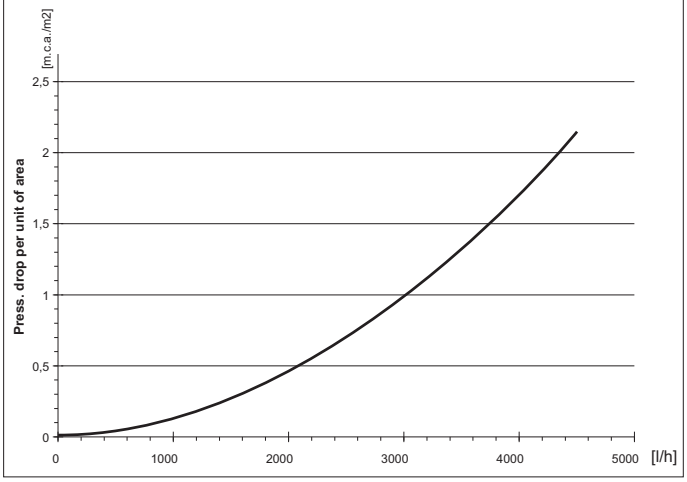
* The domestic hot water flow-rate shown on the performance curves remains constant for a variable time, depending on the volume of the storage tank. Also see the instructions in the "Selection guide".

Volume	Storage tank dimensions															
	Di	d	Htot	A	B	C	D	E	F	G	K	I	L	M	SR	SM
litres	mm															
300	690	550	1470	130	325	425	575	735	1060	1035	1185	635	835	325	370	785
500	790	650	1755	135	375	685	630	880	1336	1295	1445	780	980	330	375	870
1000	1050	850	2100	120	410	950	765	1105	1476	1560	1710	950	1150	380	425	1105

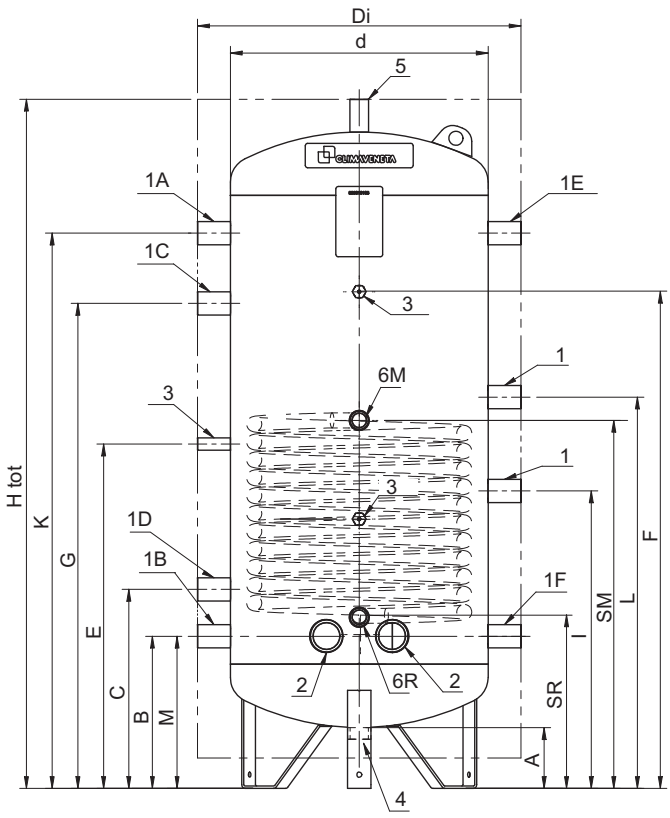
Volume	Fittings						Fixed coil	
	1	2	3	4	5	6	Surface area	Internal volume
litres	inch						m^2	l
300	1"1/4	2"	1/2"	1"1/4	1"	1"	1,5	9
500	1"1/4	2"	1/2"	1"1/4	1"	1"	2,1	13
1000	1"1/4	2"	1/2"	1"1/4	1"	1"	4	25

Pos.	Description
1A	Heat pump outlet
1B	Heat pump return
1C	Supplementary source outlet
1D	Supplementary source return
1E	Instant DHW kit outlet
1F	Instant DHW kit return
2	Electric heater attachment
3	Probe socket
4	Drain/fill
5	Vent
6M	Solar collector circuit outlet
6R	Solar collector circuit return

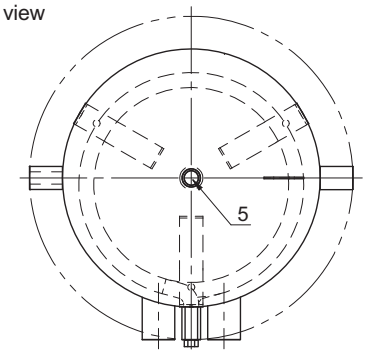
Solar heating coil pressure drop in TPS storage tanks



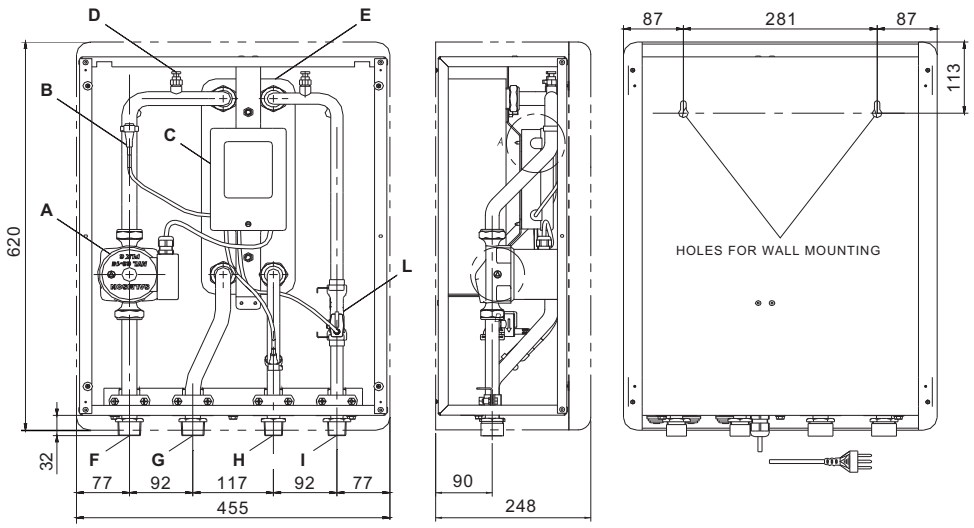
Dimensions - TPS storage tank



Top view



Dimensions - DOMH2O instant domestic hot water production kit



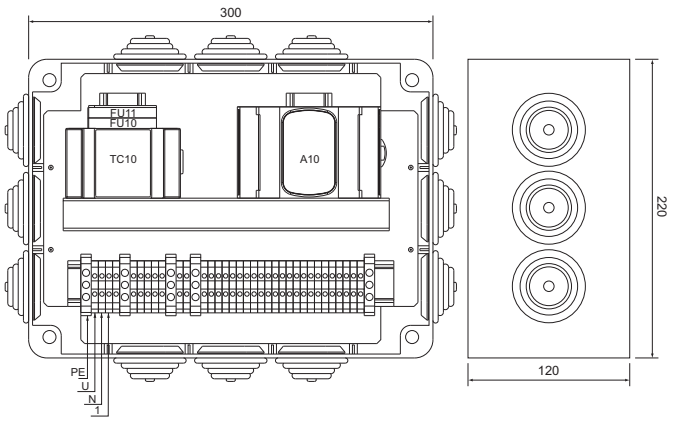
Pos.	Description
A	Primary circuit pump
B	Primary circuit temperature probe
C	Control unit
D	Manual vent valve
E	Plate heat exchanger
F	Primary circuit outlet
G	Primary circuit return
H	Mains water inlet
I	Domestic hot water outlet
L	Flow meter and temperature probe

N-EM1 EXPANSION MODULE FOR SYSTEM CONFIGURATION

The NADISYSTEM control system for residential applications gives high operating flexibility, activating zone pumps and valves depending on the set room temperature, and controlling mixing valves to ensure the correct water temperature in radiant systems according to the climate conditions set for each circuit.
With NADISYSTEM there up to 15 different types of system pre-configurations for quick and easy installation, and up to 5 remote keypads for controlling thermal load in likewise zones.

The N-EM1 expansion module is used to connect the secondary circuit components and corresponding zone thermostats depending on the selected configuration.
Up to 3 expansion modules can be used to create more complex systems.
The meaning of the terminals may change based on the selected configuration, the connections are shown on the instruction sheet provided with the expansion module.

Dimensions - N-EM1 expansion module



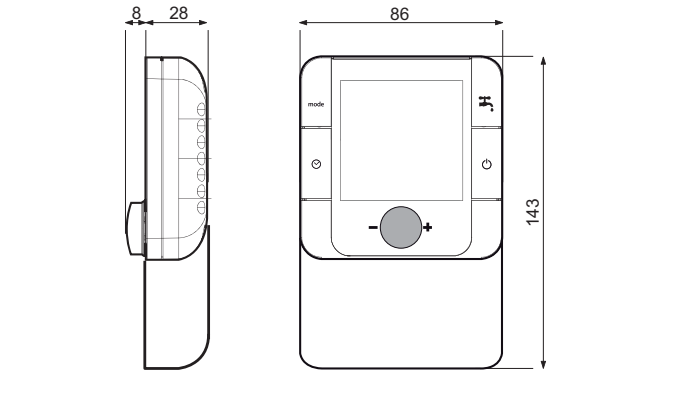
A10	Expansion module
FU10	10A fuse
FU11	1.25A fuse
TC10	230V/24V transformer

N-THC ROOM TIMER THERMOSTAT

The temperature and humidity settings are simple and intuitive using the knob on the front, while the operating mode and time bands can be selected using the 4 buttons.
The N-THC thermostat is fitted as standard with temperature and humidity probe for correct control of the temperature-humidity conditions inside the room.
By using the N-THC thermostat in the system, NadiSystem can control 5 different zones, managing temperature, humidity and time bands independently.
The simple and functional backlit display allows rapid viewing of the settings and environmental conditions.

The main settings are:
- Room temperature and humidity setting (temperature and humidity probe supplied as standard)
- Operating mode setting: heating, cooling, automatic mode changeover
- Enable domestic hot water production
- Served zone on/off
- Program time bands
- Wall-mounted installation (maximum distance 500 metres)

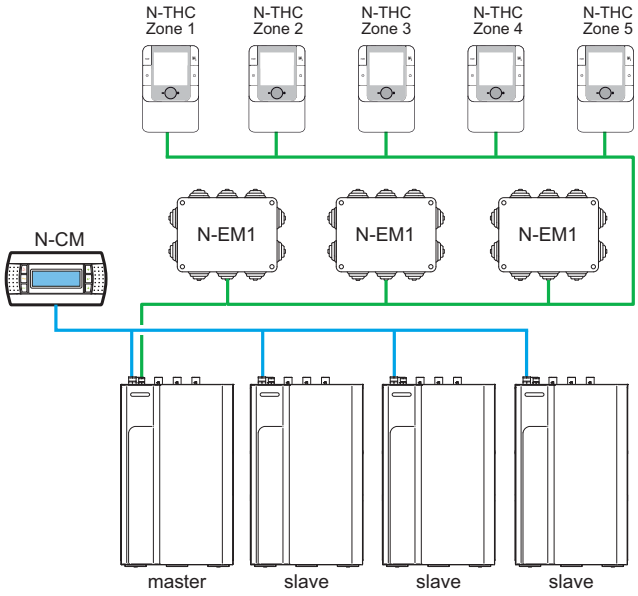
Dimensions



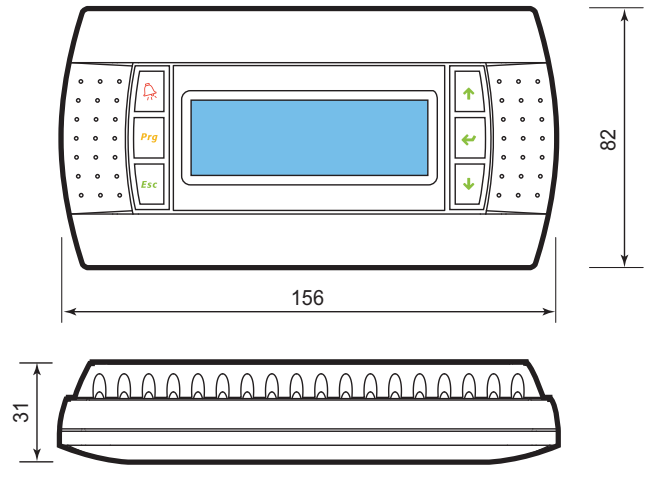
N-CM CASCADE MANAGEMENT KEYPAD

The N-CM keypad allows cascaded connection of up to 4 heat pumps to increase capacity delivered in applications with multiple occupied areas, such as hotels, schools, apartment blocks, offices and shopping centres.
The units are managed in master-slave mode, with the master unit responsible for processing the information and sending it to the slave units.
This ensures fine control over the capacity delivered, without decreasing performance, and more precise system sizing.
NADISYSTEM can determine how many cascaded units are needed to guarantee domestic hot water production, all or just one, according to requirements.
The controller also balances compressor operating hours based on time logic, activating the units in rotation, and where necessary excluding any units that are momentarily out of service, without interrupting operation of the cascade as a whole.
If the malfunctioning unit is the master, the operating parameters are transferred to another unit in the cascade, thus restoring partial operation.
The N-CM keypad can also display the operation of each heat pump connected to the cascade and the N-THC room terminals assigned to the zone in question, up to a maximum of 5 zones.

System architecture

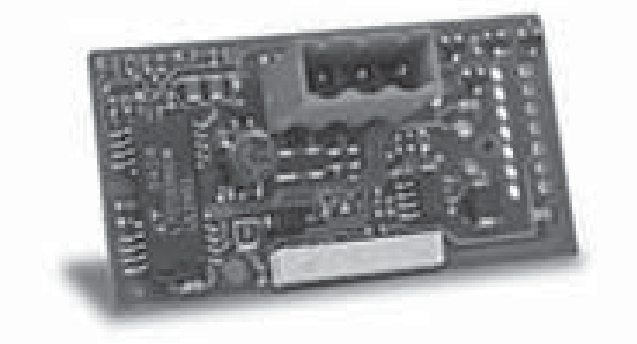


Dimensions



N-RS RS485 SERIAL CARD

The N-RS is an optional card for directly interfacing the heat pumps to an RS485 network.
The card guarantees opto-isolation of the controller from the RS485 serial network.
The maximum baud rate available is 19200 baud.
The optional card is fitted in the comb connector on the unit's board.



5. GENERAL TECHNICAL DATA

BWR MTD2 230V HYDRONIC TERMINAL APPLICATION

SIZE		0011	0025	0031	0041			
BWR MTD2/230 /B								
COOLING	(1)							
Cooling capacity	**kW**	**5,17**	**7,16**	**8,84**	**11,3**			
Total power input (unit)	kW	1,55	1,99	2,58	3,20			
EER		3,47	3,60	3,38	3,53			
ESEER		-	-	-	-			
Heat exchanger water flow	m³/h	0,891	1,23	1,52	1,94			
Heat exchanger pressure drop	kPa	7,44	11,2	16,8	18,8			
BWR MTD2/230 /B								
HEATING	(2)							
Heating capacity	**kW**	**5,23**	**7,21**	**9,11**	**11,5**			
Total power input (unit)	kW	1,69	2,33	2,97	3,55			
COP		3,06	3,13	3,03	3,19			
Heat exchanger water flow	m³/h	0,909	1,25	1,58	2,00			
Heat exchanger pressure drop	kPa	7,75	11,6	18,2	20,0			
COMPRESSORS								
Number	N°.	1	1	1	1			
Number of capacity	N°.	1	1	1	1			
Number of circuits	N°.	1	1	1	1			
Type of regulation		ON-OFF	ON-OFF	ON-OFF	ON-OFF			
Minimum capacity steps	%	100%	100%	100%	100%			
Type of refrigerant		R410A	R410A	R410A	R410A			
Refrigerant charge	kg.	1,1	1,15	1,24	1,55			
Oil charge	kg.	1,1	1,25	1,25	1,24			
NOISE LEVELS	(3)							
Total sound power	dB(A)	52	53	53	58			
Total sound pressure	dB(A)	37	38	38	43			
DIMENSIONS AND WEIGHTS	(4)							
Length	mm.	845	845	845	845			
Width	mm.	680	680	680	680			
Height	mm.	1105	1105	1105	1105			
Weight	kg.	188	190	195	210			

1 Plant (side) cooling exchanger water (in/out) 12/7 °C
Source (side) heat exchanger water (in/out) 30/35 °C
2 Source (side) heat exchanger water (in/out) 0/-3 °C
Plant (side) heating exchanger water (in/out) 40/45 °C
3 Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units
Average sound pressure level, at 1 (m.) distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level
4 Standard configuration
- Not available

BWR MTD2 400V HYDRONIC TERMINAL APPLICATION

SIZE		0025	0031	0041	0061	0071	0091	0101	0121
BWR MTD2 /B									
COOLING	(1)								
Cooling capacity	**kW**	**7,34**	**8,88**	**11,8**	**15,7**	**19,8**	**22,9**	**26,0**	**33,4**
Total power input (unit)	kW	1,89	2,43	3,23	4,02	5,06	5,76	6,75	8,44
EER		3,84	3,71	3,69	3,93	3,88	3,95	3,82	3,98
ESEER		-	-	-	-	-	-	-	-
Heat exchanger water flow	m³/h	1,26	1,53	2,03	2,71	3,42	3,94	4,48	5,75
Heat exchanger pressure drop	kPa	11,8	16,9	20,6	21,6	23,8	20,5	27,6	28,4
BWR MTD2 /B									
HEATING	(2)								
Heating capacity	**kW**	**7,13**	**8,84**	**12,0**	**15,5**	**19,1**	**22,2**	**25,5**	**32,5**
Total power input (unit)	kW	2,21	2,66	3,65	4,41	5,64	6,22	7,35	9,02
COP		3,23	3,26	3,24	3,52	3,41	3,58	3,45	3,61
Heat exchanger water flow	m³/h	1,24	1,54	2,08	2,69	3,31	3,86	4,43	5,64
Heat exchanger pressure drop	kPa	11,4	17,1	21,7	21,4	22,4	19,6	26,9	27,4
COMPRESSORS									
Number	N°.	1	1	1	1	1	1	1	1
Number of capacity	N°.	1	1	1	1	1	1	1	1
Number of circuits	N°.	1	1	1	1	1	1	1	1
Type of regulation		ON-OFF	ON-OFF	ON-OFF	ON-OFF	ON-OFF	ON-OFF	ON-OFF	ON-OFF
Minimum capacity steps	%	100%	100%	100%	100%	100%	100%	100%	100%
Type of refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge	kg.	1,15	1,24	1,55	1,7	2,65	3,1	3,5	3,7
Oil charge	kg.	1,25	1,25	1,24	1,89	2,51	3,25	3,25	3,25
NOISE LEVELS	(3)								
Total sound power	dB(A)	53	53	58	59	66	66	70	70
Total sound pressure	dB(A)	38	38	43	44	51	51	55	55
DIMENSIONS AND WEIGHTS	(4)								
Length	mm.	845	845	845	845	845	845	845	845
Width	mm.	680	680	680	680	680	680	680	680
Height	mm.	1105	1105	1105	1105	1105	1105	1105	1105
Weight	kg.	190	195	210	225	230	245	250	270

1 Plant (side) cooling exchanger water (in/out) 12/7 °C
Source (side) heat exchanger water (in/out) 30/35 °C
2 Source (side) heat exchanger water (in/out) 0/-3 °C
Plant (side) heating exchanger water (in/out) 40/45 °C
3 Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units
Average sound pressure level, at 1 (m.) distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level
4 Standard configuration
- Not available

BWR MTD2 230V RADIANT PANEL APPLICATION

SIZE		0011	0025	0031	0041			
BWR MTD2/230 /B								
COOLING	(1)							
Cooling capacity	**kW**	**7,14**	**9,83**	**12,0**	**15,1**			
Total power input (unit)	kW	1,55	1,95	2,55	3,28			
EER		4,44	4,90	4,80	4,58			
ESEER		-	-	-	-			
Heat exchanger water flow	m³/h	1,23	1,70	2,07	2,60			
Heat exchanger pressure drop	kPa	14,2	21,3	31,0	33,9			
BWR MTD2/230 /B								
HEATING	(2)							
Heating capacity	**kW**	**5,46**	**7,42**	**9,37**	**11,9**			
Total power input (unit)	kW	1,31	1,77	2,27	2,77			
COP		4,23	4,11	4,09	4,25			
Heat exchanger water flow	m³/h	0,946	1,29	1,62	2,06			
Heat exchanger pressure drop	kPa	8,39	12,2	19,1	21,3			
COMPRESSORS								
Number	N°.	1	1	1	1			
Number of capacity	N°.	1	1	1	1			
Number of circuits	N°.	1	1	1	1			
Type of regulation		ON-OFF	ON-OFF	ON-OFF	ON-OFF			
Minimum capacity steps	%	100%	100%	100%	100%			
Type of refrigerant		R410A	R410A	R410A	R410A			
Refrigerant charge	kg.	1,1	1,15	1,24	1,55			
Oil charge	kg.	1,1	1,25	1,25	1,24			
NOISE LEVELS	(3)							
Total sound power	dB(A)	52	53	53	58			
Total sound pressure	dB(A)	37	38	38	43			
DIMENSIONS AND WEIGHTS	(4)							
Length	mm.	845	845	845	845			
Width	mm.	680	680	680	680			
Height	mm.	1105	1105	1105	1105			
Weight	kg.	188	190	195	210			

1 Plant (side) cooling exchanger water (in/out) 23/18 °C
Source (side) heat exchanger water (in/out) 30/35 °C
2 Source (side) heat exchanger water (in/out) 0/-3 °C
Plant (side) heating exchanger water (in/out) 30/35 °C
3 Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units
Average sound pressure level, at 1 (m.) distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level
4 Standard configuration
- Not available

ìBWR MTD2 400V RADIANT PANEL APPLICATION

SIZE		0025	0031	0041	0061	0071	0091	0101	0121
BWR MTD2 /B									
COOLING	(1)								
Cooling capacity	**kW**	**9,47**	**12,0**	**15,7**	**21,3**	**26,9**	**30,7**	**34,8**	**44,8**
Total power input (unit)	kW	1,84	2,45	3,31	4,13	5,23	6,00	6,97	8,80
EER		5,28	4,80	4,76	5,20	5,17	5,12	4,97	5,09
ESEER		-	-	-	-	-	-	-	-
Heat exchanger water flow	m³/h	1,64	2,07	2,71	3,67	4,63	5,29	6,01	7,73
Heat exchanger pressure drop	kPa	19,8	31,2	36,9	39,8	43,8	36,9	49,6	51,4
BWR MTD2 /B									
HEATING	(2)								
Heating capacity	**kW**	**7,61**	**9,26**	**12,4**	**16,2**	**20,1**	**23,3**	**26,9**	**33,8**
Total power input (unit)	kW	1,69	2,09	2,79	3,50	4,43	4,93	5,78	7,28
COP		4,47	4,43	4,43	4,63	4,57	4,76	4,64	4,63
Heat exchanger water flow	m³/h	1,32	1,60	2,15	2,81	3,48	4,04	4,66	5,86
Heat exchanger pressure drop	kPa	12,9	18,6	23,0	23,2	24,6	21,5	29,8	29,6
COMPRESSORS									
Number	N°.	1	1	1	1	1	1	1	1
Number of capacity	N°.	1	1	1	1	1	1	1	1
Number of circuits	N°.	1	1	1	1	1	1	1	1
Type of regulation		ON-OFF	ON-OFF	ON-OFF	ON-OFF	ON-OFF	ON-OFF	ON-OFF	ON-OFF
Minimum capacity steps	%	100%	100%	100%	100%	100%	100%	100%	100%
Type of refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge	kg.	1,15	1,24	1,55	1,7	2,65	3,1	3,5	3,7
Oil charge	kg.	1,25	1,25	1,24	1,89	2,51	3,25	3,25	3,25
NOISE LEVELS	(3)								
Total sound power	dB(A)	53	53	58	59	66	66	70	70
Total sound pressure	dB(A)	38	38	43	44	51	51	55	55
DIMENSIONS AND WEIGHTS	(4)								
Length	mm.	845	845	845	845	845	845	845	845
Width	mm.	680	680	680	680	680	680	680	680
Height	mm.	1105	1105	1105	1105	1105	1105	1105	1105
Weight	kg.	190	195	210	225	230	245	250	270

1 Plant (side) cooling exchanger water (in/out) 23/18 °C
Source (side) heat exchanger water (in/out) 30/35 °C
2 Source (side) heat exchanger water (in/out) 0/-3 °C
Plant (side) heating exchanger water (in/out) 30/35 °C
3 Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units
Average sound pressure level, at 1 (m.) distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level
4 Standard configuration
- Not available

BWR MTD2 230V COOLING PERFORMANCE

0011

Tcd	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**7**						**9**						**12**		
Pf	**5,73**	**5,47**	**5,35**	**5,17**	**4,86**	**4,72**	**6,11**	**5,83**	**5,71**	**5,52**	**5,19**	**5,05**	**6,69**	**6,39**	**6,26**	**6,05**	**5,70**	**5,55**
Pat	1,20	1,36	1,43	1,55	1,75	1,84	1,20	1,37	1,44	1,55	1,76	1,84	1,21	1,37	1,45	1,56	1,76	1,84
Qev	0,987	0,941	0,921	0,891	0,836	0,813	1,05	1,00	0,984	0,951	0,894	0,870	1,15	1,10	1,08	1,04	0,982	0,956
Dpev	9,13	8,30	7,96	7,44	6,55	6,19	10,4	9,46	9,07	8,49	7,49	7,09	12,5	11,4	10,9	10,2	9,04	8,57
Pt	6,93	6,83	6,79	6,72	6,60	6,56	7,32	7,20	7,15	7,08	6,95	6,89	7,90	7,76	7,70	7,61	7,46	7,39
Qcd	1,18	1,17	1,16	1,15	1,13	1,12	1,25	1,23	1,22	1,21	1,19	1,18	1,35	1,33	1,32	1,30	1,28	1,26
Dpcd	13,2	12,8	12,6	12,4	11,9	11,7	14,7	14,2	14,0	13,7	13,2	13,0	17,1	16,5	16,3	15,9	15,2	15,0
Tev				**13**						**15**						**18**		
Pf	**6,89**	**6,57**	**6,44**	**6,23**	**5,87**	**5,71**	**7,28**	**6,95**	**6,81**	**6,59**	**6,21**	**6,05**	**7,88**	**7,52**	**7,37**	**7,14**	**6,73**	**6,57**
Pat	1,21	1,38	1,45	1,56	1,76	1,84	1,21	1,38	1,45	1,56	1,76	1,84	1,21	1,37	1,44	1,55	1,75	1,83
Qev	1,19	1,13	1,11	1,07	1,01	0,985	1,26	1,20	1,17	1,14	1,07	1,04	1,36	1,30	1,27	1,23	1,16	1,13
Dpev	13,2	12,0	11,6	10,8	9,59	9,10	14,8	13,5	12,9	12,1	10,8	10,2	17,3	15,8	15,2	14,2	12,7	12,0
Pt	8,10	7,95	7,89	7,79	7,63	7,56	8,49	8,32	8,26	8,15	7,97	7,89	9,08	8,89	8,81	8,69	8,48	8,40
Qcd	1,39	1,36	1,35	1,33	1,30	1,29	1,45	1,43	1,41	1,40	1,36	1,35	1,56	1,52	1,51	1,49	1,45	1,44
Dpcd	18,0	17,4	17,1	16,7	16,0	15,7	19,8	19,0	18,7	18,3	17,4	17,1	22,7	21,8	21,4	20,8	19,8	19,4

0025

Tcd	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**7**						**9**						**12**		
Pf	**7,93**	**7,55**	**7,40**	**7,16**	**6,74**	**6,58**	**8,44**	**8,05**	**7,88**	**7,63**	**7,20**	**7,02**	**9,22**	**8,79**	**8,62**	**8,35**	**7,89**	**7,71**
Pat	1,52	1,74	1,83	1,99	2,27	2,40	1,52	1,74	1,83	1,99	2,27	2,39	1,52	1,73	1,83	1,98	2,26	2,39
Qev	1,37	1,30	1,27	1,23	1,16	1,13	1,45	1,39	1,36	1,31	1,24	1,21	1,59	1,52	1,49	1,44	1,36	1,33
Dpev	13,8	12,5	12,0	11,2	9,98	9,49	15,7	14,2	13,6	12,8	11,4	10,8	18,7	17,0	16,3	15,3	13,7	13,1
Pt	9,46	9,29	9,23	9,14	9,02	8,97	9,97	9,78	9,71	9,62	9,47	9,42	10,7	10,5	10,4	10,3	10,2	10,1
Qcd	1,62	1,59	1,58	1,56	1,54	1,53	1,71	1,67	1,66	1,64	1,62	1,61	1,84	1,80	1,79	1,77	1,74	1,73
Dpcd	19,4	18,7	18,4	18,1	17,6	17,4	21,5	20,7	20,4	20,0	19,4	19,2	25,0	24,0	23,7	23,2	22,4	22,1
Tev				**13**						**15**						**18**		
Pf	**9,48**	**9,04**	**8,87**	**8,59**	**8,13**	**7,94**	**10,0**	**9,55**	**9,37**	**9,08**	**8,60**	**8,40**	**10,8**	**10,3**	**10,1**	**9,83**	**9,32**	**9,11**
Pat	1,52	1,73	1,82	1,98	2,26	2,38	1,51	1,72	1,82	1,97	2,25	2,37	1,49	1,71	1,80	1,95	2,23	2,35
Qev	1,63	1,56	1,53	1,48	1,40	1,37	1,73	1,65	1,62	1,57	1,48	1,45	1,86	1,78	1,75	1,70	1,61	1,57
Dpev	19,8	18,0	17,3	16,2	14,5	13,9	22,0	20,1	19,3	18,2	16,3	15,5	25,7	23,5	22,6	21,3	19,2	18,3
Pt	11,0	10,8	10,7	10,6	10,4	10,3	11,5	11,3	11,2	11,1	10,8	10,8	12,3	12,0	11,9	11,8	11,5	11,5
Qcd	1,88	1,85	1,83	1,81	1,78	1,77	1,97	1,93	1,92	1,89	1,86	1,85	2,11	2,06	2,05	2,02	1,98	1,96
Dpcd	26,2	25,2	24,8	24,3	23,4	23,1	28,8	27,6	27,2	26,6	25,6	25,2	32,9	31,5	31,0	30,2	29,0	28,6

0031

Tcd	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**7**						**9**						**12**		
Pf	**9,75**	**9,31**	**9,13**	**8,84**	**8,33**	**8,12**	**10,4**	**9,90**	**9,70**	**9,40**	**8,87**	**8,65**	**11,3**	**10,8**	**10,6**	**10,3**	**9,69**	**9,45**
Pat	1,99	2,26	2,38	2,58	2,94	3,10	1,99	2,26	2,38	2,58	2,94	3,10	1,99	2,26	2,38	2,58	2,94	3,09
Qev	1,68	1,60	1,57	1,52	1,43	1,40	1,78	1,70	1,67	1,62	1,53	1,49	1,95	1,86	1,82	1,77	1,67	1,63
Dpev	20,4	18,6	17,9	16,8	14,9	14,2	23,1	21,1	20,3	19,0	16,9	16,1	27,4	25,1	24,1	22,6	20,2	19,2
Pt	11,7	11,6	11,5	11,4	11,3	11,2	12,3	12,2	12,1	12,0	11,8	11,7	13,3	13,0	13,0	12,8	12,6	12,5
Qcd	2,01	1,98	1,97	1,95	1,93	1,92	2,11	2,08	2,07	2,05	2,02	2,01	2,27	2,23	2,22	2,20	2,16	2,15
Dpcd	29,2	28,4	28,0	27,6	26,9	26,6	32,3	31,4	31,0	30,4	29,5	29,2	37,4	36,2	35,7	34,9	33,8	33,4
Tev				**13**						**15**						**18**		
Pf	**11,6**	**11,1**	**10,9**	**10,5**	**9,96**	**9,72**	**12,2**	**11,7**	**11,5**	**11,1**	**10,5**	**10,3**	**13,2**	**12,6**	**12,3**	**12,0**	**11,3**	**11,1**
Pat	1,99	2,26	2,38	2,57	2,93	3,09	1,98	2,25	2,37	2,56	2,92	3,08	1,97	2,24	2,36	2,55	2,90	3,05
Qev	2,00	1,91	1,87	1,82	1,72	1,68	2,11	2,01	1,98	1,92	1,81	1,77	2,27	2,17	2,13	2,07	1,96	1,91
Dpev	29,0	26,5	25,5	23,9	21,4	20,4	32,2	29,4	28,3	26,6	23,8	22,7	37,5	34,2	32,9	31,0	27,8	26,6
Pt	13,6	13,3	13,2	13,1	12,9	12,8	14,2	13,9	13,8	13,7	13,4	13,3	15,1	14,8	14,7	14,5	14,2	14,1
Qcd	2,33	2,28	2,27	2,24	2,21	2,19	2,43	2,39	2,37	2,34	2,30	2,28	2,59	2,54	2,52	2,49	2,44	2,42
Dpcd	39,2	37,8	37,3	36,5	35,3	34,8	42,9	41,3	40,7	39,8	38,4	37,8	48,8	46,8	46,0	44,9	43,2	42,6

0041

Tcd	25	30	32	35	40	42	25	30	32	35	40	42	25	30	32	35	40	42
Tev				**7**						**9**						**12**		
Pf	**12,4**	**11,8**	**11,6**	**11,3**	**10,7**	**10,4**	**13,1**	**12,6**	**12,3**	**11,9**	**11,3**	**11,1**	**14,3**	**13,6**	**13,4**	**13,0**	**12,3**	**12,0**
Pat	2,53	2,84	2,98	3,20	3,59	3,76	2,54	2,86	3,00	3,22	3,61	3,77	2,56	2,89	3,03	3,24	3,62	3,79
Qev	2,13	2,04	2,00	1,94	1,83	1,79	2,26	2,16	2,12	2,06	1,95	1,91	2,46	2,35	2,30	2,24	2,12	2,08
Dpev	22,8	20,8	20,0	18,8	16,9	16,1	25,7	23,4	22,5	21,2	19,0	18,2	30,3	27,6	26,6	25,1	22,6	21,6
Pt	14,9	14,7	14,6	14,5	14,2	14,2	15,7	15,4	15,3	15,2	14,9	14,8	16,8	16,5	16,4	16,2	15,9	15,8
Qcd	2,55	2,51	2,49	2,47	2,43	2,42	2,68	2,64	2,62	2,59	2,55	2,54	2,88	2,83	2,81	2,78	2,73	2,71
Dpcd	32,6	31,5	31,1	30,6	29,7	29,3	36,0	34,8	34,3	33,7	32,6	32,2	41,5	40,0	39,4	38,6	37,2	36,7
Tev				**13**						**15**						**18**		
Pf	**14,6**	**14,0**	**13,7**	**13,3**	**12,6**	**12,4**	**15,4**	**14,7**	**14,4**	**14,0**	**13,3**	**13,0**	**16,5**	**15,8**	**15,5**	**15,1**	**14,3**	**14,0**
Pat	2,56	2,89	3,03	3,25	3,63	3,79	2,57	2,91	3,05	3,26	3,64	3,79	2,58	2,92	3,06	3,28	3,64	3,79
Qev	2,52	2,41	2,37	2,30	2,18	2,13	2,65	2,54	2,49	2,42	2,30	2,25	2,85	2,73	2,68	2,60	2,47	2,42
Dpev	31,9	29,1	28,0	26,4	23,8	22,8	35,3	32,2	31,0	29,3	26,4	25,3	40,7	37,2	35,9	33,9	30,6	29,3
Pt	17,2	16,9	16,8	16,6	16,3	16,2	18,0	17,6	17,5	17,3	16,9	16,8	19,1	18,7	18,6	18,3	18,0	17,8
Qcd	2,94	2,89	2,87	2,84	2,79	2,77	3,08	3,02	2,99	2,96	2,90	2,88	3,27	3,21	3,18	3,14	3,08	3,05
Dpcd	43,4	41,8	41,2	40,3	38,9	38,3	47,4	45,6	44,9	43,8	42,2	41,5	53,6	51,5	50,7	49,4	47,4	46,6

Tcd [°C] - Plant (side) heating exchanger output water temperature
Tev [°C] - Source (side) heat exchanger output water temperature
Pf [kW] - Cooling capacity
Pat [kW] - Total power input
Qev [m³/h] - Plant (side) heat exchanger water flow
Dpev [kPa] - Plant (side) cooling exchanger pressure drop
Pt [kW] - Heating capacity
Qcd [m³/h] - Source (side) heating exchanger water flow
Dpcd [kPa] - Source (side) heat exchanger pressure drop
'-' Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T

BWR MTD2 400V COOLING PERFORMANCE

0025																		
Tcd	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**
Tev			**7**						**9**						**12**			
Pf	**8,27**	**7,82**	**7,63**	**7,34**	**6,84**	**6,63**	**8,72**	**8,25**	**8,06**	**7,76**	**7,24**	**7,03**	**9,36**	**8,87**	**8,67**	**8,36**	**7,82**	**7,60**
Pat	1,44	1,65	1,74	1,89	2,15	2,27	1,44	1,65	1,74	1,88	2,15	2,26	1,44	1,64	1,73	1,87	2,13	2,25
Qev	1,42	1,35	1,31	1,26	1,18	1,14	1,50	1,42	1,39	1,34	1,25	1,21	1,61	1,53	1,49	1,44	1,35	1,31
Dpev	15,0	13,4	12,8	11,8	10,3	9,66	16,7	14,9	14,3	13,2	11,5	10,9	19,3	17,3	16,5	15,4	13,5	12,7
Pt	9,71	9,47	9,37	9,23	8,99	8,90	10,2	9,90	9,80	9,64	9,39	9,29	10,8	10,5	10,4	10,2	9,96	9,85
Qcd	1,66	1,62	1,60	1,58	1,54	1,52	1,74	1,69	1,68	1,65	1,61	1,59	1,85	1,80	1,78	1,75	1,71	1,69
Dpcd	20,5	19,4	19,0	18,4	17,5	17,1	22,4	21,3	20,8	20,2	19,1	18,7	25,3	24,0	23,5	22,8	21,5	21,0
Tev			**13**						**15**						**18**			
Pf	**9,57**	**9,07**	**8,87**	**8,55**	**8,01**	**7,78**	**9,97**	**9,46**	**9,25**	**8,93**	**8,37**	**8,14**	**10,5**	**10,0**	**9,81**	**9,47**	**8,90**	**8,66**
Pat	1,43	1,64	1,73	1,87	2,13	2,24	1,43	1,63	1,72	1,86	2,12	2,23	1,41	1,61	1,70	1,84	2,09	2,20
Qev	1,65	1,56	1,53	1,47	1,38	1,34	1,72	1,63	1,60	1,54	1,44	1,40	1,82	1,73	1,69	1,64	1,54	1,49
Dpev	20,1	18,1	17,3	16,1	14,1	13,3	21,9	19,7	18,9	17,6	15,4	14,6	24,5	22,2	21,2	19,8	17,5	16,5
Pt	11,0	10,7	10,6	10,4	10,1	10,0	11,4	11,1	11,0	10,8	10,5	10,4	12,0	11,6	11,5	11,3	11,0	10,9
Qcd	1,89	1,84	1,82	1,79	1,74	1,72	1,95	1,90	1,88	1,85	1,80	1,78	2,05	2,00	1,97	1,94	1,88	1,86
Dpcd	26,3	24,9	24,4	23,6	22,3	21,8	28,2	26,8	26,2	25,3	23,9	23,4	31,1	29,5	28,8	27,9	26,3	25,7

0031																		
Tcd	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**
Tev			**7**						**9**						**12**			
Pf	**9,84**	**9,37**	**9,17**	**8,88**	**8,37**	**8,16**	**10,4**	**9,95**	**9,75**	**9,44**	**8,91**	**8,69**	**11,4**	**10,8**	**10,6**	**10,3**	**9,73**	**9,50**
Pat	1,90	2,15	2,26	2,43	2,74	2,86	1,91	2,16	2,27	2,44	2,75	2,88	1,91	2,17	2,28	2,45	2,76	2,89
Qev	1,69	1,61	1,58	1,53	1,44	1,40	1,80	1,71	1,68	1,63	1,53	1,50	1,96	1,87	1,83	1,77	1,68	1,64
Dpev	20,8	18,9	18,1	16,9	15,0	14,3	23,5	21,3	20,5	19,2	17,1	16,3	27,8	25,3	24,3	22,8	20,4	19,4
Pt	11,7	11,5	11,4	11,3	11,1	11,0	12,4	12,1	12,0	11,9	11,7	11,6	13,3	13,0	12,9	12,7	12,5	12,4
Qcd	2,01	1,97	1,96	1,93	1,90	1,88	2,11	2,07	2,06	2,03	1,99	1,98	2,27	2,23	2,21	2,18	2,14	2,12
Dpcd	29,2	28,1	27,7	27,1	26,1	25,7	32,4	31,2	30,7	30,0	28,8	28,4	37,5	36,0	35,4	34,5	33,1	32,6
Tev			**13**						**15**						**18**			
Pf	**11,7**	**11,1**	**10,9**	**10,6**	**10,0**	**9,77**	**12,3**	**11,7**	**11,5**	**11,2**	**10,6**	**10,3**	**13,2**	**12,6**	**12,4**	**12,0**	**11,4**	**11,1**
Pat	1,91	2,17	2,28	2,46	2,76	2,89	1,91	2,17	2,28	2,46	2,77	2,90	1,91	2,17	2,28	2,45	2,76	2,89
Qev	2,01	1,92	1,88	1,82	1,72	1,68	2,12	2,02	1,98	1,92	1,82	1,78	2,28	2,18	2,14	2,07	1,97	1,92
Dpev	29,3	26,7	25,7	24,1	21,6	20,6	32,5	29,7	28,5	26,8	24,0	22,9	37,7	34,4	33,1	31,2	28,0	26,8
Pt	13,6	13,3	13,2	13,0	12,8	12,7	14,2	13,9	13,8	13,6	13,3	13,2	15,1	14,8	14,7	14,5	14,2	14,0
Qcd	2,33	2,28	2,26	2,23	2,19	2,17	2,43	2,38	2,36	2,33	2,28	2,26	2,59	2,54	2,51	2,48	2,43	2,40
Dpcd	39,2	37,6	37,0	36,1	34,7	34,1	42,9	41,1	40,4	39,4	37,8	37,1	48,6	46,6	45,8	44,6	42,7	41,9

0041																		
Tcd	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**
Tev			**7**						**9**						**12**			
Pf	**13,0**	**12,4**	**12,1**	**11,8**	**11,1**	**10,9**	**13,8**	**13,1**	**12,9**	**12,5**	**11,8**	**11,6**	**14,9**	**14,2**	**14,0**	**13,6**	**12,9**	**12,6**
Pat	2,49	2,84	2,99	3,23	3,67	3,86	2,50	2,86	3,01	3,25	3,69	3,87	2,52	2,88	3,04	3,28	3,71	3,89
Qev	2,24	2,13	2,09	2,03	1,92	1,87	2,37	2,26	2,22	2,15	2,04	1,99	2,57	2,46	2,41	2,34	2,22	2,17
Dpev	25,0	22,8	21,9	20,6	18,4	17,6	28,1	25,6	24,6	23,2	20,8	19,9	33,1	30,2	29,0	27,4	24,6	23,5
Pt	15,5	15,2	15,1	15,0	14,8	14,7	16,3	16,0	15,9	15,7	15,5	15,4	17,4	17,1	17,0	16,8	16,6	16,5
Qcd	2,65	2,60	2,59	2,57	2,53	2,52	2,78	2,74	2,72	2,69	2,65	2,64	2,98	2,93	2,91	2,88	2,84	2,82
Dpcd	35,1	34,0	33,6	33,0	32,1	31,8	38,8	37,5	37,0	36,3	35,3	34,9	44,6	43,1	42,5	41,6	40,3	39,8
Tev			**13**						**15**						**18**			
Pf	**15,3**	**14,6**	**14,3**	**13,9**	**13,2**	**12,9**	**16,1**	**15,4**	**15,1**	**14,6**	**13,9**	**13,6**	**17,2**	**16,5**	**16,2**	**15,7**	**14,9**	**14,6**
Pat	2,53	2,89	3,05	3,29	3,71	3,89	2,53	2,90	3,06	3,30	3,72	3,89	2,54	2,92	3,07	3,31	3,73	3,89
Qev	2,64	2,52	2,47	2,40	2,28	2,23	2,77	2,65	2,60	2,53	2,40	2,35	2,97	2,84	2,79	2,71	2,58	2,53
Dpev	34,8	31,8	30,6	28,8	26,0	24,9	38,5	35,2	33,9	31,9	28,8	27,6	44,3	40,5	39,1	36,9	33,3	32,0
Pt	17,8	17,5	17,4	17,2	16,9	16,8	18,6	18,3	18,1	17,9	17,6	17,5	19,8	19,4	19,3	19,0	18,7	18,5
Qcd	3,05	3,00	2,98	2,95	2,90	2,88	3,19	3,13	3,11	3,07	3,02	3,00	3,39	3,32	3,30	3,26	3,20	3,18
Dpcd	46,7	45,0	44,4	43,5	42,0	41,5	50,9	49,0	48,3	47,3	45,6	45,0	57,5	55,4	54,5	53,3	51,3	50,5

Tcd [°C] - Plant (side) heating exchanger output water temperature
Tev [°C] - Source (side) heat exchanger output water temperature
Pf [kW] - Cooling capacity
Pat [kW] - Total power input
Qev [m³/h] - Plant (side) heat exchanger water flow
Dpev [kPa] - Plant (side) cooling exchanger pressure drop
Pt [kW] - Heating capacity
Qcd [m³/h] - Source (side) heating exchanger water flow
Dpcd [kPa] - Source (side) heat exchanger pressure drop
'-' Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T

BWR MTD2 400V COOLING PERFORMANCE

0061																		
Tcd	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**
Tev			**7**						**9**						**12**			
Pf	**17,2**	**16,5**	**16,2**	**15,7**	**14,9**	**14,5**	**18,3**	**17,5**	**17,2**	**16,7**	**15,8**	**15,5**	**19,9**	**19,1**	**18,7**	**18,2**	**17,3**	**16,9**
Pat	3,23	3,60	3,76	4,02	4,50	4,71	3,26	3,63	3,79	4,06	4,53	4,74	3,30	3,67	3,83	4,09	4,57	4,77
Qev	2,97	2,84	2,79	2,71	2,56	2,50	3,15	3,02	2,96	2,88	2,73	2,66	3,43	3,29	3,23	3,14	2,98	2,91
Dpev	26,0	23,8	22,9	21,6	19,3	18,4	29,3	26,9	25,9	24,4	21,9	20,9	34,7	31,9	30,8	29,1	26,1	24,9
Pt	20,5	20,1	20,0	19,7	19,4	19,2	21,6	21,2	21,0	20,8	20,4	20,2	23,2	22,8	22,6	22,3	21,8	21,7
Qcd	3,50	3,44	3,41	3,38	3,31	3,29	3,69	3,62	3,60	3,55	3,48	3,46	3,97	3,90	3,87	3,82	3,74	3,71
Dpcd	36,2	34,9	34,4	33,6	32,4	31,9	40,2	38,7	38,1	37,3	35,8	35,2	46,6	44,8	44,1	43,1	41,3	40,6
Tev			**13**						**15**						**18**			
Pf	**20,4**	**19,6**	**19,3**	**18,7**	**17,8**	**17,4**	**21,5**	**20,7**	**20,3**	**19,7**	**18,7**	**18,3**	**23,1**	**22,3**	**21,9**	**21,3**	**20,2**	**19,8**
Pat	3,31	3,68	3,84	4,10	4,58	4,78	3,33	3,70	3,86	4,12	4,59	4,80	3,36	3,72	3,88	4,13	4,60	4,80
Qev	3,52	3,38	3,32	3,23	3,06	2,99	3,71	3,56	3,50	3,40	3,23	3,16	3,99	3,84	3,78	3,67	3,49	3,41
Dpev	36,6	33,7	32,5	30,7	27,6	26,4	40,6	37,5	36,2	34,2	30,8	29,4	47,0	43,5	42,1	39,8	35,9	34,3
Pt	23,8	23,3	23,1	22,8	22,3	22,1	24,8	24,4	24,2	23,9	23,3	23,1	26,5	26,0	25,8	25,4	24,8	24,6
Qcd	4,07	3,99	3,96	3,91	3,83	3,79	4,26	4,18	4,14	4,09	4,00	3,96	4,54	4,45	4,42	4,36	4,26	4,21
Dpcd	48,8	47,0	46,2	45,1	43,2	42,4	53,4	51,4	50,6	49,3	47,1	46,3	60,8	58,5	57,5	56,0	53,4	52,4

0071																		
Tcd	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**
Tev			**7**						**9**						**12**			
Pf	**21,7**	**20,8**	**20,5**	**19,8**	**18,7**	**18,3**	**23,0**	**22,1**	**21,7**	**21,1**	**20,0**	**19,5**	**25,0**	**24,1**	**23,7**	**23,0**	**21,8**	**21,3**
Pat	4,03	4,51	4,72	5,06	5,69	5,96	4,08	4,55	4,76	5,10	5,73	6,00	4,13	4,61	4,82	5,16	5,77	6,04
Qev	3,74	3,59	3,52	3,42	3,22	3,14	3,97	3,81	3,74	3,64	3,44	3,35	4,30	4,15	4,08	3,97	3,76	3,67
Dpev	28,5	26,2	25,3	23,8	21,2	20,1	32,0	29,6	28,6	26,9	24,1	22,9	37,7	35,1	33,9	32,1	28,8	27,4
Pt	25,8	25,4	25,2	24,9	24,4	24,2	27,1	26,7	26,5	26,2	25,7	25,5	29,1	28,7	28,5	28,2	27,6	27,3
Qcd	4,41	4,34	4,31	4,26	4,18	4,14	4,64	4,57	4,54	4,49	4,40	4,36	4,98	4,91	4,88	4,83	4,72	4,68
Dpcd	39,6	38,4	37,8	37,0	35,5	34,9	43,8	42,5	41,9	41,0	39,4	38,7	50,6	49,1	48,5	47,4	45,5	44,6
Tev			**13**						**15**						**18**			
Pf	**25,6**	**24,7**	**24,3**	**23,7**	**22,4**	**21,9**	**26,9**	**26,0**	**25,6**	**24,9**	**23,7**	**23,1**	**28,8**	**27,9**	**27,5**	**26,9**	**25,5**	**24,9**
Pat	4,15	4,63	4,84	5,17	5,78	6,05	4,19	4,66	4,87	5,20	5,80	6,06	4,23	4,70	4,91	5,23	5,82	6,07
Qev	4,41	4,26	4,19	4,08	3,87	3,77	4,64	4,48	4,41	4,30	4,08	3,98	4,97	4,82	4,75	4,63	4,41	4,31
Dpev	39,7	37,0	35,8	33,9	30,4	29,0	43,8	41,0	39,7	37,7	33,9	32,3	50,3	47,4	46,0	43,8	39,6	37,8
Pt	29,8	29,3	29,1	28,8	28,2	27,9	31,1	30,7	30,5	30,1	29,5	29,2	33,0	32,6	32,4	32,1	31,4	31,0
Qcd	5,10	5,03	4,99	4,94	4,83	4,79	5,32	5,25	5,22	5,16	5,05	5,00	5,66	5,60	5,56	5,50	5,38	5,32
Dpcd	52,9	51,5	50,8	49,7	47,6	46,6	57,7	56,2	55,5	54,3	52,0	50,9	65,2	63,8	63,0	61,7	58,9	57,7

0091																		
Tcd	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**
Tev			**7**						**9**						**12**			
Pf	**25,2**	**24,1**	**23,6**	**22,9**	**21,7**	**21,2**	**26,8**	**25,6**	**25,1**	**24,3**	**23,1**	**22,5**	**29,2**	**27,8**	**27,3**	**26,4**	**25,1**	**24,6**
Pat	4,61	5,16	5,39	5,76	6,42	6,69	4,67	5,21	5,45	5,81	6,47	6,75	4,75	5,29	5,52	5,89	6,54	6,82
Qev	4,34	4,15	4,07	3,94	3,73	3,65	4,62	4,41	4,32	4,19	3,97	3,88	5,03	4,79	4,70	4,56	4,33	4,23
Dpev	24,8	22,6	21,8	20,5	18,3	17,5	28,0	25,5	24,6	23,1	20,7	19,8	33,2	30,2	29,0	27,3	24,6	23,6
Pt	29,8	29,3	29,0	28,7	28,1	27,9	31,5	30,8	30,5	30,1	29,5	29,3	33,9	33,1	32,8	32,3	31,6	31,4
Qcd	5,11	5,01	4,97	4,91	4,81	4,77	5,39	5,27	5,23	5,16	5,05	5,01	5,81	5,67	5,62	5,54	5,42	5,38
Dpcd	34,3	33,0	32,4	31,7	30,4	29,9	38,2	36,6	35,9	35,0	33,6	33,1	44,4	42,3	41,5	40,4	38,7	38,1
Tev			**13**						**15**						**18**			
Pf	**29,9**	**28,5**	**28,0**	**27,2**	**25,8**	**25,2**	**31,5**	**30,0**	**29,4**	**28,6**	**27,2**	**26,6**	**33,9**	**32,2**	**31,6**	**30,7**	**29,2**	**28,6**
Pat	4,78	5,31	5,55	5,91	6,56	6,84	4,83	5,36	5,59	5,95	6,60	6,88	4,91	5,42	5,64	6,00	6,66	6,94
Qev	5,16	4,92	4,82	4,68	4,45	4,35	5,44	5,18	5,08	4,93	4,68	4,59	5,85	5,56	5,45	5,29	5,04	4,94
Dpev	35,1	31,9	30,6	28,8	26,0	24,9	38,9	35,3	33,9	31,9	28,9	27,7	45,0	40,7	39,2	36,9	33,4	32,1
Pt	34,7	33,9	33,5	33,1	32,3	32,1	36,3	35,4	35,0	34,5	33,8	33,5	38,8	37,7	37,2	36,7	35,9	35,6
Qcd	5,95	5,80	5,74	5,67	5,54	5,50	6,23	6,06	6,00	5,92	5,79	5,74	6,65	6,46	6,39	6,29	6,15	6,10
Dpcd	46,5	44,3	43,4	42,2	40,4	39,8	51,0	48,4	47,4	46,1	44,1	43,4	58,2	54,8	53,7	52,1	49,8	49,0

Tcd [°C] - Plant (side) heating exchanger output water temperature
Tev [°C] - Source (side) heat exchanger output water temperature
Pf [kW] - Cooling capacity
Pat [kW] - Total power input
Qev [m³/h] - Plant (side) heat exchanger water flow
Dpev [kPa] - Plant (side) cooling exchanger pressure drop
Pt [kW] - Heating capacity
Qcd [m³/h] - Source (side) heating exchanger water flow
Dpcd [kPa] - Source (side) heat exchanger pressure drop
'-' Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T

BWR MTD2 400V COOLING PERFORMANCE

0101																		
Tcd	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**
Tev			**7**						**9**						**12**			
Pf	**28,5**	**27,3**	**26,8**	**26,0**	**24,6**	**23,9**	**30,1**	**29,0**	**28,5**	**27,6**	**26,1**	**25,5**	**32,6**	**31,4**	**30,9**	**30,0**	**28,5**	**27,8**
Pat	5,38	6,02	6,30	6,75	7,58	7,93	5,44	6,08	6,36	6,81	7,63	7,98	5,52	6,15	6,43	6,88	7,69	8,04
Qev	4,90	4,70	4,62	4,48	4,23	4,12	5,19	4,99	4,90	4,76	4,50	4,38	5,62	5,41	5,32	5,18	4,90	4,79
Dpev	33,0	30,4	29,3	27,6	24,5	23,3	37,0	34,2	33,0	31,1	27,8	26,4	43,4	40,2	38,9	36,8	33,0	31,5
Pt	33,8	33,3	33,1	32,8	32,1	31,9	35,6	35,0	34,8	34,4	33,7	33,4	38,1	37,6	37,3	36,9	36,1	35,8
Qcd	5,79	5,71	5,67	5,61	5,50	5,45	6,09	6,00	5,96	5,89	5,77	5,72	6,53	6,43	6,39	6,32	6,19	6,13
Dpcd	46,0	44,7	44,1	43,2	41,5	40,7	50,8	49,4	48,7	47,7	45,8	45,0	58,5	56,8	56,1	54,8	52,6	51,7
Tev			**13**						**15**						**18**			
Pf	**33,4**	**32,2**	**31,7**	**30,8**	**29,2**	**28,5**	**35,1**	**33,8**	**33,3**	**32,4**	**30,8**	**30,1**	**37,5**	**36,3**	**35,7**	**34,8**	**33,1**	**32,4**
Pat	5,54	6,17	6,45	6,90	7,71	8,06	5,59	6,21	6,49	6,93	7,74	8,09	5,65	6,26	6,53	6,97	7,76	8,11
Qev	5,76	5,56	5,46	5,31	5,04	4,92	6,05	5,84	5,74	5,59	5,31	5,19	6,48	6,26	6,16	6,01	5,72	5,60
Dpev	45,6	42,4	41,0	38,8	34,9	33,2	50,3	46,8	45,3	42,9	38,7	37,0	57,6	53,8	52,2	49,6	44,9	43,0
Pt	39,0	38,4	38,1	37,7	36,9	36,6	40,7	40,1	39,8	39,4	38,5	38,2	43,2	42,5	42,2	41,8	40,9	40,5
Qcd	6,67	6,58	6,53	6,46	6,33	6,27	6,96	6,86	6,82	6,74	6,60	6,54	7,40	7,29	7,24	7,16	7,02	6,95
Dpcd	61,2	59,4	58,6	57,3	55,0	54,0	66,6	64,7	63,8	62,4	59,9	58,8	75,2	73,0	72,0	70,5	67,6	66,3

0121																		
Tcd	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**	**25**	**30**	**32**	**35**	**40**	**42**
Tev			**7**						**9**						**12**			
Pf	**36,2**	**34,9**	**34,3**	**33,4**	**31,7**	**31,0**	**38,4**	**37,0**	**36,4**	**35,4**	**33,7**	**32,9**	**41,7**	**40,2**	**39,6**	**38,5**	**36,7**	**35,9**
Pat	6,94	7,62	7,93	8,44	9,40	9,82	7,03	7,70	8,01	8,52	9,47	9,89	7,17	7,83	8,13	8,63	9,56	9,98
Qev	6,24	6,01	5,91	5,75	5,46	5,34	6,62	6,38	6,27	6,10	5,80	5,67	7,19	6,93	6,82	6,64	6,32	6,18
Dpev	33,5	31,0	30,0	28,4	25,6	24,5	37,6	35,0	33,8	32,0	29,0	27,7	44,4	41,3	40,0	38,0	34,3	32,8
Pt	43,2	42,5	42,2	41,8	41,1	40,8	45,4	44,7	44,4	44,0	43,2	42,8	48,9	48,0	47,7	47,2	46,2	45,8
Qcd	7,38	7,27	7,23	7,16	7,03	6,98	7,78	7,65	7,60	7,53	7,39	7,33	8,36	8,23	8,17	8,08	7,92	7,85
Dpcd	46,9	45,5	44,9	44,0	42,6	41,9	52,0	50,4	49,7	48,7	47,0	46,2	60,1	58,2	57,4	56,1	53,9	53,0
Tev			**13**						**15**						**18**			
Pf	**42,8**	**41,3**	**40,6**	**39,6**	**37,7**	**36,8**	**45,0**	**43,4**	**42,8**	**41,7**	**39,7**	**38,8**	**48,3**	**46,7**	**45,9**	**44,8**	**42,7**	**41,7**
Pat	7,21	7,87	8,17	8,66	9,59	10,00	7,30	7,94	8,24	8,72	9,63	10,0	7,42	8,05	8,34	8,80	9,66	10,0
Qev	7,38	7,12	7,00	6,82	6,49	6,35	7,76	7,49	7,37	7,19	6,84	6,69	8,34	8,06	7,93	7,73	7,36	7,21
Dpev	46,8	43,6	42,2	40,0	36,3	34,7	51,8	48,3	46,8	44,4	40,2	38,5	59,8	55,8	54,1	51,4	46,6	44,6
Pt	50,0	49,2	48,8	48,2	47,2	46,8	52,3	51,4	51,0	50,4	49,3	48,8	55,7	54,7	54,3	53,6	52,3	51,8
Qcd	8,56	8,42	8,36	8,27	8,10	8,03	8,95	8,80	8,74	8,64	8,45	8,37	9,55	9,38	9,31	9,19	8,98	8,88
Dpcd	63,0	61,0	60,1	58,7	56,4	55,4	68,9	66,6	65,7	64,1	61,4	60,2	78,4	75,7	74,5	72,6	69,3	67,9

Tcd [°C] - Plant (side) heating exchanger output water temperature
Tev [°C] - Source (side) heat exchanger output water temperature
Pf [kW] - Cooling capacity
Pat [kW] - Total power input
Qev [m³/h] - Plant (side) heat exchanger water flow
Dpev [kPa] - Plant (side) cooling exchanger pressure drop
Pt [kW] - Heating capacity
Qcd [m³/h] - Source (side) heating exchanger water flow
Dpcd [kPa] - Source (side) heat exchanger pressure drop
'-' Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T

BWR MTD2 230V HEATING PERFORMANCE

0011																		
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**5,13**	**6,25**	**7,41**	**7,88**	**8,60**	**9,82**	**5,03**	**6,12**	**7,23**	**7,68**	**8,37**	**9,53**	**4,94**	**5,97**	**7,04**	**7,47**	**8,12**	**9,23**
Qcd	0,887	1,08	1,28	1,36	1,49	1,70	0,871	1,06	1,25	1,33	1,45	1,65	0,856	1,04	1,22	1,30	1,41	1,60
Pcd	7,38	11,0	15,4	17,4	20,7	27,0	7,12	10,5	14,7	16,6	19,7	25,5	6,87	10,1	14,0	15,7	18,6	24,0
Pat	1,15	1,17	1,19	1,19	1,19	1,19	1,30	1,33	1,35	1,36	1,36	1,35	1,47	1,51	1,53	1,54	1,54	1,53
Pf	5,17	5,17	5,17	5,17	5,17	5,17	5,17	5,17	5,17	5,17	5,17	5,17	5,17	5,17	5,17	5,17	5,17	5,17
Qev	0,891	0,891	0,891	0,891	0,891	0,891	0,891	0,891	0,891	0,891	0,891	0,891	0,891	0,891	0,891	0,891	0,891	0,891
Dpev	7,44	7,44	7,44	7,44	7,44	7,44	7,44	7,44	7,44	7,44	7,44	7,44	7,44	7,44	7,44	7,44	7,44	7,44
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**4,84**	**5,83**	**6,83**	**7,24**	**7,86**	**8,91**	**-**	**5,67**	**6,62**	**7,01**	**7,59**	**8,58**	**-**	**-**	**6,40**	**6,76**	**7,30**	**8,24**
Qcd	0,841	1,01	1,19	1,26	1,37	1,55	-	0,988	1,15	1,22	1,32	1,49	-	-	1,12	1,18	1,27	1,44
Pcd	6,64	9,61	13,2	14,8	17,5	22,5	-	9,15	12,5	13,9	16,4	20,9	-	-	11,7	13,0	15,2	19,4
Pat	1,67	1,71	1,73	1,74	1,74	1,72	-	1,94	1,95	1,96	1,95	1,92	-	-	2,19	2,19	2,18	2,15
Pf	5,17	5,17	5,17	5,17	5,17	5,17	-	5,17	5,17	5,17	5,17	5,17	-	-	5,17	5,17	5,17	5,17
Qev	0,891	0,891	0,891	0,891	0,891	0,891	-	0,891	0,891	0,891	0,891	0,891	-	-	0,891	0,891	0,891	0,891
Dpev	7,44	7,44	7,44	7,44	7,44	7,44	-	7,44	7,44	7,44	7,44	7,44	-	-	7,44	7,44	7,44	7,44

0025																		
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**6,98**	**8,42**	**9,89**	**10,5**	**11,4**	**12,9**	**6,87**	**8,25**	**9,66**	**10,2**	**11,1**	**12,6**	**6,79**	**8,09**	**9,44**	**9,98**	**10,8**	**12,2**
Qcd	1,21	1,46	1,71	1,81	1,97	2,24	1,19	1,43	1,67	1,77	1,92	2,18	1,18	1,40	1,64	1,73	1,88	2,12
Pcd	10,8	15,7	21,7	24,4	28,8	37,1	10,5	15,1	20,7	23,2	27,4	35,2	10,3	14,6	19,8	22,2	26,1	33,4
Pat	1,53	1,55	1,56	1,56	1,55	1,53	1,76	1,78	1,78	1,78	1,78	1,76	2,02	2,04	2,04	2,04	2,03	2,01
Pf	7,16	7,16	7,16	7,16	7,16	7,16	7,16	7,16	7,16	7,16	7,16	7,16	7,16	7,16	7,16	7,16	7,16	7,16
Qev	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23	1,23
Dpev	11,2	11,2	11,2	11,2	11,2	11,2	11,2	11,2	11,2	11,2	11,2	11,2	11,2	11,2	11,2	11,2	11,2	11,2
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**6,72**	**7,96**	**9,23**	**9,75**	**10,5**	**11,9**	**-**	**7,84**	**9,04**	**9,54**	**10,3**	**11,6**	**-**	**-**	**8,87**	**9,34**	**10,0**	**11,3**
Qcd	1,17	1,38	1,60	1,69	1,83	2,07	-	1,36	1,57	1,66	1,79	2,02	-	-	1,55	1,63	1,75	1,96
Pcd	10,1	14,1	19,1	21,3	24,9	31,7	-	13,8	18,3	20,4	23,8	30,1	-	-	17,7	19,6	22,7	28,6
Pat	2,32	2,34	2,34	2,33	2,32	2,29	-	2,67	2,67	2,66	2,64	2,60	-	-	3,03	3,02	3,00	2,94
Pf	7,16	7,16	7,16	7,16	7,16	7,16	-	7,16	7,16	7,16	7,16	7,16	-	-	7,16	7,16	7,16	7,16
Qev	1,23	1,23	1,23	1,23	1,23	1,23	-	1,23	1,23	1,23	1,23	1,23	-	-	1,23	1,23	1,23	1,23
Dpev	11,2	11,2	11,2	11,2	11,2	11,2	-	11,2	11,2	11,2	11,2	11,2	-	-	11,2	11,2	11,2	11,2

0031																		
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**8,80**	**10,6**	**12,4**	**13,1**	**14,2**	**16,1**	**8,69**	**10,4**	**12,1**	**12,8**	**13,9**	**15,6**	**8,58**	**10,2**	**11,9**	**12,5**	**13,5**	**15,2**
Qcd	1,52	1,83	2,14	2,27	2,46	2,78	1,50	1,80	2,10	2,22	2,40	2,71	1,49	1,77	2,06	2,17	2,35	2,64
Pcd	16,8	24,3	33,3	37,3	43,9	56,1	16,4	23,5	32,0	35,8	41,9	53,3	16,1	22,8	30,7	34,3	40,0	50,6
Pat	1,97	2,00	2,01	2,01	2,01	1,98	2,26	2,29	2,30	2,29	2,29	2,26	2,59	2,61	2,62	2,62	2,61	2,58
Pf	8,84	8,84	8,84	8,84	8,84	8,84	8,84	8,84	8,84	8,84	8,84	8,84	8,84	8,84	8,84	8,84	8,84	8,84
Qev	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52
Dpev	16,8	16,8	16,8	16,8	16,8	16,8	16,8	16,8	16,8	16,8	16,8	16,8	16,8	16,8	16,8	16,8	16,8	16,8
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**8,49**	**10,0**	**11,6**	**12,2**	**13,2**	**14,8**	**-**	**9,85**	**11,3**	**11,9**	**12,8**	**14,4**	**-**	**-**	**11,1**	**11,6**	**12,5**	**14,0**
Qcd	1,48	1,74	2,02	2,13	2,29	2,57	-	1,72	1,97	2,08	2,24	2,51	-	-	1,93	2,03	2,18	2,44
Pcd	15,8	22,0	29,4	32,8	38,1	48,0	-	21,3	28,2	31,3	36,3	45,6	-	-	27,0	29,9	34,5	43,3
Pat	2,96	2,99	2,99	2,99	2,98	2,94	-	3,41	3,41	3,40	3,39	3,34	-	-	3,87	3,86	3,84	3,79
Pf	8,84	8,84	8,84	8,84	8,84	8,84	-	8,84	8,84	8,84	8,84	8,84	-	-	8,84	8,84	8,84	8,84
Qev	1,52	1,52	1,52	1,52	1,52	1,52	-	1,52	1,52	1,52	1,52	1,52	-	-	1,52	1,52	1,52	1,52
Dpev	16,8	16,8	16,8	16,8	16,8	16,8	-	16,8	16,8	16,8	16,8	16,8	-	-	16,8	16,8	16,8	16,8

0041																		
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**11,2**	**13,4**	**15,7**	**16,6**	**17,9**	**20,2**	**11,1**	**13,2**	**15,3**	**16,2**	**17,5**	**19,6**	**10,9**	**12,9**	**15,0**	**15,8**	**17,0**	**19,1**
Qcd	1,94	2,32	2,71	2,86	3,10	3,49	1,92	2,28	2,65	2,80	3,02	3,40	1,89	2,24	2,60	2,74	2,95	3,31
Pcd	18,9	27,1	36,7	41,0	48,0	60,9	18,4	26,1	35,2	39,2	45,8	57,9	17,8	25,1	33,7	37,5	43,7	54,9
Pat	2,44	2,50	2,55	2,56	2,58	2,60	2,74	2,81	2,86	2,88	2,90	2,92	3,11	3,17	3,22	3,23	3,25	3,27
Pf	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3
Qev	1,94	1,94	1,94	1,94	1,94	1,94	1,94	1,94	1,94	1,94	1,94	1,94	1,94	1,94	1,94	1,94	1,94	1,94
Dpev	18,8	18,8	18,8	18,8	18,8	18,8	18,8	18,8	18,8	18,8	18,8	18,8	18,8	18,8	18,8	18,8	18,8	18,8
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**10,7**	**12,7**	**14,6**	**15,4**	**16,6**	**18,6**	**-**	**12,4**	**14,3**	**15,1**	**16,2**	**18,0**	**-**	**-**	**14,0**	**14,7**	**15,8**	**17,5**
Qcd	1,86	2,20	2,54	2,68	2,88	3,22	-	2,16	2,49	2,62	2,82	3,14	-	-	2,44	2,57	2,75	3,05
Pcd	17,3	24,3	32,4	36,0	41,7	52,1	-	23,5	31,1	34,5	39,8	49,3	-	-	29,9	33,0	37,9	46,7
Pat	3,53	3,58	3,62	3,63	3,63	3,63	-	4,04	4,05	4,05	4,04	4,01	-	-	4,53	4,51	4,48	4,40
Pf	11,3	11,3	11,3	11,3	11,3	11,3	-	11,3	11,3	11,3	11,3	11,3	-	-	11,3	11,3	11,3	11,3
Qev	1,94	1,94	1,94	1,94	1,94	1,94	-	1,94	1,94	1,94	1,94	1,94	-	-	1,94	1,94	1,94	1,94
Dpev	18,8	18,8	18,8	18,8	18,8	18,8	-	18,8	18,8	18,8	18,8	18,8	-	-	18,8	18,8	18,8	18,8

Tev [°C] - Source (side) heat exchanger output water temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m³/h) - Plant (side) heating exchanger water flow
Dpcd (kPa) - Plant (side) heating exchanger pressure drop
Pat (kW) - Total power input
Pf (kW) - Cooling capacity
Qev (m³/h) - Source (side) heat exchanger water flow
Dpev (kPa) - Source (side) cooling exchanger pressure drop
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T

BWR MTD2 400V HEATING PERFORMANCE

0025																		
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**7,23**	**8,77**	**10,2**	**10,7**	**11,5**	**12,7**	**7,01**	**8,48**	**9,85**	**10,4**	**11,1**	**12,2**	**6,79**	**8,20**	**9,51**	**10,0**	**10,7**	**11,8**
Qcd	1,25	1,52	1,76	1,85	1,99	2,19	1,21	1,47	1,71	1,79	1,92	2,12	1,18	1,42	1,65	1,74	1,86	2,05
Pcd	11,6	17,0	23,0	25,5	29,2	35,6	10,9	16,0	21,5	23,8	27,4	33,3	10,3	15,0	20,1	22,3	25,6	31,1
Pat	1,47	1,48	1,48	1,48	1,47	1,45	1,68	1,69	1,70	1,69	1,68	1,66	1,92	1,94	1,94	1,93	1,92	1,89
Pf	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34
Qev	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26	1,26
Dpev	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**6,58**	**7,93**	**9,17**	**9,64**	**10,3**	**11,4**	**-**	**7,65**	**8,84**	**9,28**	**9,92**	**10,9**	**-**	**-**	**8,50**	**8,92**	**9,52**	**10,4**
Qcd	1,14	1,38	1,59	1,68	1,79	1,97	-	1,33	1,54	1,62	1,73	1,90	-	-	1,48	1,56	1,66	1,82
Pcd	9,68	14,0	18,8	20,8	23,8	28,9	-	13,1	17,5	19,3	22,1	26,7	-	-	16,3	17,9	20,4	24,6
Pat	2,20	2,22	2,21	2,20	2,19	2,15	-	2,53	2,51	2,50	2,48	2,44	-	-	2,84	2,83	2,80	2,75
Pf	7,34	7,34	7,34	7,34	7,34	7,34	-	7,34	7,34	7,34	7,34	7,34	-	-	7,34	7,34	7,34	7,34
Qev	1,26	1,26	1,26	1,26	1,26	1,26	-	1,26	1,26	1,26	1,26	1,26	-	-	1,26	1,26	1,26	1,26
Dpev	11,8	11,8	11,8	11,8	11,8	11,8	-	11,8	11,8	11,8	11,8	11,8	-	-	11,8	11,8	11,8	11,8

0031																		
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**8,76**	**10,6**	**12,4**	**13,1**	**14,2**	**16,1**	**8,56**	**10,3**	**12,1**	**12,8**	**13,8**	**15,6**	**8,37**	**10,0**	**11,7**	**12,4**	**13,4**	**15,2**
Qcd	1,52	1,83	2,14	2,27	2,46	2,78	1,48	1,78	2,09	2,21	2,40	2,71	1,45	1,74	2,04	2,15	2,33	2,63
Pcd	16,6	24,2	33,3	37,3	43,9	56,1	15,9	23,1	31,6	35,5	41,6	53,1	15,3	22,0	30,1	33,6	39,4	50,2
Pat	1,83	1,88	1,92	1,92	1,93	1,92	2,07	2,13	2,17	2,18	2,19	2,18	2,33	2,40	2,45	2,46	2,47	2,46
Pf	8,88	8,88	8,88	8,88	8,88	8,88	8,88	8,88	8,88	8,88	8,88	8,88	8,88	8,88	8,88	8,88	8,88	8,88
Qev	1,53	1,53	1,53	1,53	1,53	1,53	1,53	1,53	1,53	1,53	1,53	1,53	1,53	1,53	1,53	1,53	1,53	1,53
Dpev	16,9	16,9	16,9	16,9	16,9	16,9	16,9	16,9	16,9	16,9	16,9	16,9	16,9	16,9	16,9	16,9	16,9	16,9
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**8,20**	**9,80**	**11,4**	**12,1**	**13,1**	**14,7**	**-**	**9,57**	**11,1**	**11,7**	**12,7**	**14,2**	**-**	**-**	**10,8**	**11,4**	**12,3**	**13,8**
Qcd	1,43	1,70	1,98	2,10	2,27	2,56	-	1,67	1,93	2,04	2,21	2,48	-	-	1,88	1,99	2,14	2,40
Pcd	14,7	21,0	28,6	31,9	37,3	47,3	-	20,1	27,1	30,2	35,3	44,6	-	-	25,7	28,6	33,3	41,9
Pat	2,63	2,70	2,75	2,76	2,77	2,77	-	3,03	3,08	3,09	3,10	3,10	-	-	3,43	3,45	3,45	3,45
Pf	8,88	8,88	8,88	8,88	8,88	8,88	-	8,88	8,88	8,88	8,88	8,88	-	-	8,88	8,88	8,88	8,88
Qev	1,53	1,53	1,53	1,53	1,53	1,53	-	1,53	1,53	1,53	1,53	1,53	-	-	1,53	1,53	1,53	1,53
Dpev	16,9	16,9	16,9	16,9	16,9	16,9	-	16,9	16,9	16,9	16,9	16,9	-	-	16,9	16,9	16,9	16,9

0041																		
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**11,7**	**14,0**	**16,3**	**17,2**	**18,6**	**21,0**	**11,5**	**13,7**	**15,9**	**16,8**	**18,2**	**20,4**	**11,3**	**13,5**	**15,6**	**16,4**	**17,7**	**19,9**
Qcd	2,02	2,42	2,82	2,98	3,22	3,62	1,99	2,37	2,76	2,91	3,15	3,54	1,97	2,33	2,70	2,85	3,08	3,45
Pcd	20,4	29,3	39,8	44,4	51,9	65,8	19,9	28,2	38,1	42,5	49,6	62,6	19,4	27,3	36,6	40,7	47,4	59,6
Pat	2,41	2,48	2,52	2,54	2,56	2,57	2,76	2,82	2,88	2,89	2,91	2,94	3,16	3,23	3,27	3,29	3,30	3,32
Pf	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8	11,8
Qev	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
Dpev	20,6	20,6	20,6	20,6	20,6	20,6	20,6	20,6	20,6	20,6	20,6	20,6	20,6	20,6	20,6	20,6	20,6	20,6
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**11,2**	**13,2**	**15,3**	**16,1**	**17,3**	**19,4**	**-**	**13,0**	**14,9**	**15,7**	**16,9**	**18,9**	**-**	**-**	**14,7**	**15,4**	**16,5**	**18,3**
Qcd	1,94	2,30	2,65	2,79	3,01	3,37	-	2,26	2,60	2,74	2,94	3,28	-	-	2,56	2,69	2,88	3,20
Pcd	18,9	26,4	35,2	39,1	45,3	56,7	-	25,6	33,9	37,6	43,4	54,0	-	-	32,7	36,1	41,5	51,3
Pat	3,63	3,68	3,71	3,72	3,73	3,73	-	4,19	4,20	4,20	4,19	4,15	-	-	4,73	4,72	4,68	4,61
Pf	11,8	11,8	11,8	11,8	11,8	11,8	-	11,8	11,8	11,8	11,8	11,8	-	-	11,8	11,8	11,8	11,8
Qev	2,03	2,03	2,03	2,03	2,03	2,03	-	2,03	2,03	2,03	2,03	2,03	-	-	2,03	2,03	2,03	2,03
Dpev	20,6	20,6	20,6	20,6	20,6	20,6	-	20,6	20,6	20,6	20,6	20,6	-	-	20,6	20,6	20,6	20,6

Tev [°C] - Source (side) heat exchanger output water temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m³/h) - Plant (side) heating exchanger water flow
Dpcd (kPa) - Plant (side) heating exchanger pressure drop
Pat (kW) - Total power input
Pf (kW) - Cooling capacity
Qev (m³/h) - Source (side) heat exchanger water flow
Dpev (kPa) - Source (side) cooling exchanger pressure drop
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T

BWR MTD2 400V HEATING PERFORMANCE

0061																		
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**15,3**	**18,5**	**21,7**	**23,0**	**25,0**	**28,3**	**15,0**	**18,0**	**21,1**	**22,4**	**24,3**	**27,5**	**14,7**	**17,6**	**20,6**	**21,8**	**23,6**	**26,7**
Qcd	2,65	3,19	3,75	3,98	4,32	4,89	2,60	3,12	3,66	3,88	4,21	4,76	2,55	3,05	3,57	3,78	4,09	4,63
Pcd	20,7	30,1	41,5	46,6	54,9	70,6	19,9	28,8	39,5	44,3	52,2	66,9	19,1	27,5	37,6	42,1	49,4	63,1
Pat	3,07	3,20	3,29	3,33	3,37	3,41	3,45	3,58	3,68	3,71	3,75	3,80	3,87	4,01	4,12	4,15	4,19	4,23
Pf	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7	15,7
Qev	2,71	2,71	2,71	2,71	2,71	2,71	2,71	2,71	2,71	2,71	2,71	2,71	2,71	2,71	2,71	2,71	2,71	2,71
Dpev	21,6	21,6	21,6	21,6	21,6	21,6	21,6	21,6	21,6	21,6	21,6	21,6	21,6	21,6	21,6	21,6	21,6	21,6
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**14,4**	**17,2**	**20,0**	**21,2**	**22,9**	**25,8**	**-**	**16,8**	**19,4**	**20,5**	**22,1**	**24,8**	**-**	**-**	**18,9**	**19,9**	**21,4**	**23,9**
Qcd	2,50	2,98	3,48	3,68	3,98	4,48	-	2,92	3,38	3,57	3,85	4,33	-	-	3,29	3,47	3,73	4,16
Pcd	18,4	26,3	35,7	39,8	46,6	59,2	-	25,1	33,8	37,6	43,8	55,2	-	-	31,9	35,4	41,0	51,1
Pat	4,34	4,50	4,61	4,64	4,68	4,71	-	5,03	5,15	5,18	5,22	5,24	-	-	5,74	5,77	5,81	5,83
Pf	15,7	15,7	15,7	15,7	15,7	15,7	-	15,7	15,7	15,7	15,7	15,7	-	-	15,7	15,7	15,7	15,7
Qev	2,71	2,71	2,71	2,71	2,71	2,71	-	2,71	2,71	2,71	2,71	2,71	-	-	2,71	2,71	2,71	2,71
Dpev	21,6	21,6	21,6	21,6	21,6	21,6	-	21,6	21,6	21,6	21,6	21,6	-	-	21,6	21,6	21,6	21,6

0071																		
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**19,0**	**22,9**	**26,9**	**28,5**	**30,8**	**34,7**	**18,6**	**22,4**	**26,2**	**27,8**	**30,1**	**34,0**	**18,1**	**21,8**	**25,5**	**27,0**	**29,3**	**33,0**
Qcd	3,29	3,97	4,65	4,92	5,33	6,01	3,21	3,88	4,54	4,81	5,21	5,88	3,14	3,78	4,43	4,69	5,08	5,73
Pcd	22,0	32,1	44,0	49,3	57,8	73,6	21,0	30,6	42,0	47,1	55,3	70,5	20,1	29,1	39,9	44,7	52,5	66,9
Pat	3,87	4,00	4,11	4,15	4,21	4,29	4,37	4,51	4,62	4,66	4,71	4,78	4,94	5,08	5,20	5,23	5,28	5,33
Pf	19,8	19,8	19,8	19,8	19,8	19,8	19,8	19,8	19,8	19,8	19,8	19,8	19,8	19,8	19,8	19,8	19,8	19,8
Qev	3,42	3,42	3,42	3,42	3,42	3,42	3,42	3,42	3,42	3,42	3,42	3,42	3,42	3,42	3,42	3,42	3,42	3,42
Dpev	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**17,7**	**21,2**	**24,8**	**26,2**	**28,3**	**31,9**	**-**	**20,6**	**24,0**	**25,3**	**27,3**	**30,6**	**-**	**-**	**23,1**	**24,3**	**26,2**	**29,1**
Qcd	3,07	3,68	4,30	4,55	4,92	5,54	-	3,58	4,17	4,40	4,75	5,33	-	-	4,03	4,24	4,56	5,08
Pcd	19,2	27,6	37,7	42,2	49,4	62,6	-	26,2	35,4	39,5	46,0	57,9	-	-	33,0	36,7	42,4	52,6
Pat	5,57	5,73	5,85	5,88	5,92	5,94	-	6,46	6,57	6,60	6,62	6,61	-	-	7,37	7,39	7,40	7,34
Pf	19,8	19,8	19,8	19,8	19,8	19,8	-	19,8	19,8	19,8	19,8	19,8	-	-	19,8	19,8	19,8	19,8
Qev	3,42	3,42	3,42	3,42	3,42	3,42	-	3,42	3,42	3,42	3,42	3,42	-	-	3,42	3,42	3,42	3,42
Dpev	23,8	23,8	23,8	23,8	23,8	23,8	-	23,8	23,8	23,8	23,8	23,8	-	-	23,8	23,8	23,8	23,8

0091																		
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**30**						**35**						**40**			
Pt	**22,0**	**26,6**	**31,3**	**33,2**	**36,0**	**40,7**	**21,5**	**26,0**	**30,5**	**32,3**	**34,9**	**39,4**	**21,1**	**25,4**	**29,7**	**31,4**	**34,0**	**38,2**
Qcd	3,80	4,61	5,41	5,74	6,22	7,04	3,73	4,51	5,28	5,59	6,05	6,82	3,65	4,40	5,15	5,44	5,89	6,63
Pcd	19,0	27,9	38,6	43,3	51,0	65,2	18,3	26,7	36,7	41,1	48,2	61,3	17,6	25,5	34,9	39,0	45,7	57,9
Pat	4,33	4,49	4,63	4,68	4,75	4,85	4,86	5,03	5,18	5,23	5,29	5,38	5,47	5,64	5,78	5,83	5,89	5,98
Pf	22,9	22,9	22,9	22,9	22,9	22,9	22,9	22,9	22,9	22,9	22,9	22,9	22,9	22,9	22,9	22,9	22,9	22,9
Qev	3,94	3,94	3,94	3,94	3,94	3,94	3,94	3,94	3,94	3,94	3,94	3,94	3,94	3,94	3,94	3,94	3,94	3,94
Dpev	20,5	20,5	20,5	20,5	20,5	20,5	20,5	20,5	20,5	20,5	20,5	20,5	20,5	20,5	20,5	20,5	20,5	20,5
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd			**45**						**50**						**55**			
Pt	**20,5**	**24,7**	**28,8**	**30,5**	**33,0**	**37,2**	**-**	**23,9**	**28,0**	**29,6**	**32,1**	**36,2**	**-**	**-**	**27,1**	**28,7**	**31,2**	**35,4**
Qcd	3,57	4,29	5,01	5,30	5,73	6,46	-	4,17	4,87	5,15	5,58	6,31	-	-	4,73	5,01	5,44	6,18
Pcd	16,8	24,2	33,0	36,9	43,3	54,9	-	22,9	31,2	35,0	41,0	52,4	-	-	29,4	33,0	39,0	50,3
Pat	6,15	6,30	6,43	6,48	6,54	6,63	-	7,03	7,14	7,18	7,25	7,35	-	-	7,90	7,94	8,01	8,13
Pf	22,9	22,9	22,9	22,9	22,9	22,9	-	22,9	22,9	22,9	22,9	22,9	-	-	22,9	22,9	22,9	22,9
Qev	3,94	3,94	3,94	3,94	3,94	3,94	-	3,94	3,94	3,94	3,94	3,94	-	-	3,94	3,94	3,94	3,94
Dpev	20,5	20,5	20,5	20,5	20,5	20,5	-	20,5	20,5	20,5	20,5	20,5	-	-	20,5	20,5	20,5	20,5

Tev [°C] - Source (side) heat exchanger output water temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m³/h) - Plant (side) heating exchanger water flow
Dpcd (kPa) - Plant (side) heating exchanger pressure drop
Pat (kW) - Total power input
Pf (kW) - Cooling capacity
Qev (m³/h) - Source (side) heat exchanger water flow
Dpev (kPa) - Source (side) cooling exchanger pressure drop
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T

BWR MTD2 400V HEATING PERFORMANCE

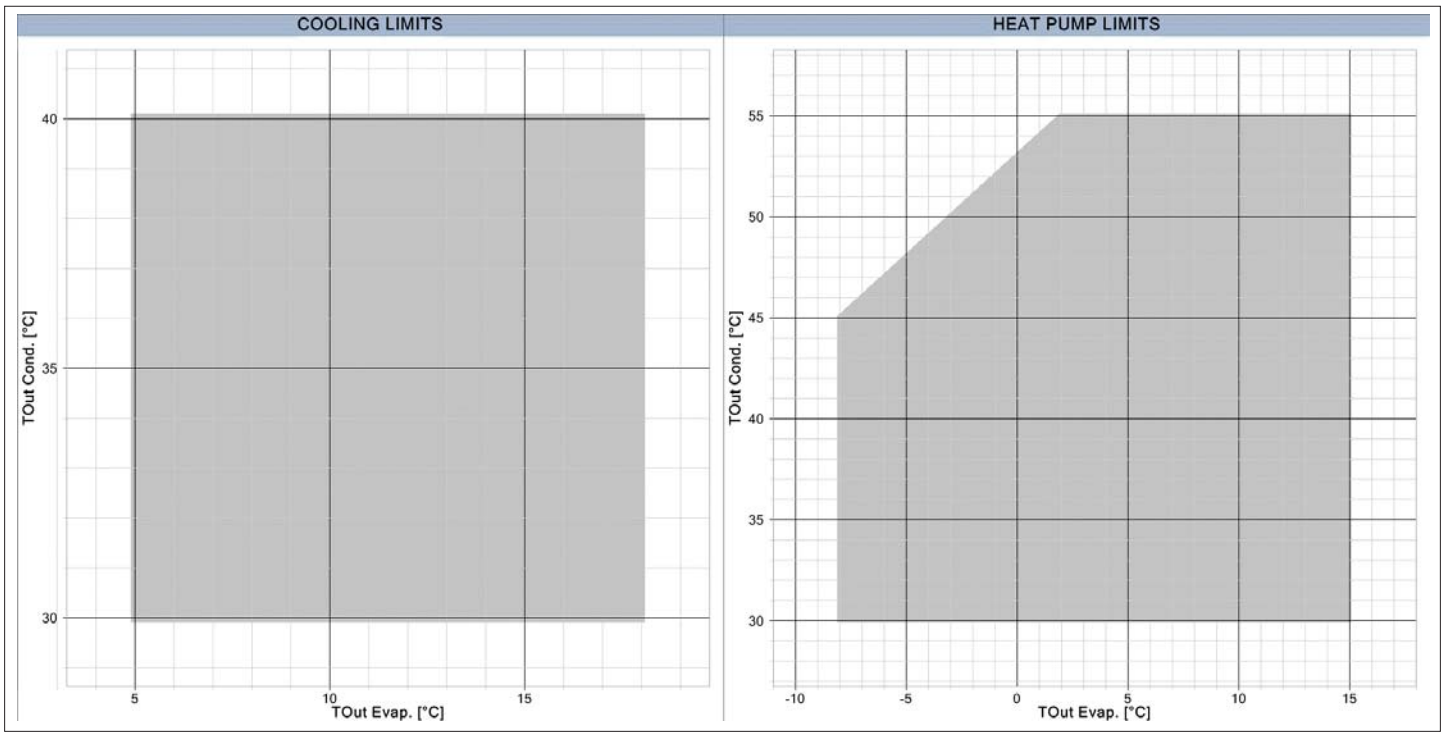
0101																		
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd	**30**						**35**						**40**					
Pt	**25,4**	**30,6**	**35,8**	**37,9**	**41,0**	**46,0**	**24,9**	**29,9**	**35,0**	**37,0**	**40,0**	**45,0**	**24,2**	**29,1**	**34,0**	**36,0**	**38,9**	**43,8**
Qcd	4,40	5,30	6,19	6,55	7,08	7,96	4,30	5,18	6,06	6,41	6,93	7,80	4,21	5,06	5,91	6,24	6,75	7,60
Pcd	26,6	38,6	52,7	58,9	68,9	87,1	25,4	36,9	50,4	56,4	65,9	83,4	24,3	35,1	47,9	53,5	62,6	79,3
Pat	5,06	5,23	5,38	5,43	5,49	5,58	5,71	5,89	6,04	6,08	6,14	6,22	6,44	6,63	6,78	6,83	6,88	6,94
Pf	26,0	26,0	26,0	26,0	26,0	26,0	26,0	26,0	26,0	26,0	26,0	26,0	26,0	26,0	26,0	26,0	26,0	26,0
Qev	4,48	4,48	4,48	4,48	4,48	4,48	4,48	4,48	4,48	4,48	4,48	4,48	4,48	4,48	4,48	4,48	4,48	4,48
Dpev	27,6	27,6	27,6	27,6	27,6	27,6	27,6	27,6	27,6	27,6	27,6	27,6	27,6	27,6	27,6	27,6	27,6	27,6
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd	**45**						**50**						**55**					
Pt	**23,6**	**28,3**	**33,0**	**34,9**	**37,7**	**42,5**	**-**	**27,4**	**31,8**	**33,7**	**36,4**	**41,0**	**-**	**-**	**30,6**	**32,3**	**34,9**	**39,3**
Qcd	4,11	4,92	5,73	6,06	6,56	7,38	-	4,77	5,54	5,86	6,33	7,14	-	-	5,34	5,63	6,09	6,86
Pcd	23,1	33,2	45,1	50,5	59,0	74,8	-	31,2	42,2	47,1	55,1	69,9	-	-	39,1	43,6	50,9	64,6
Pat	7,27	7,47	7,61	7,66	7,71	7,75	-	8,39	8,54	8,58	8,62	8,65	-	-	9,54	9,58	9,62	9,64
Pf	26,0	26,0	26,0	26,0	26,0	26,0	-	26,0	26,0	26,0	26,0	26,0	-	-	26,0	26,0	26,0	26,0
Qev	4,48	4,48	4,48	4,48	4,48	4,48	-	4,48	4,48	4,48	4,48	4,48	-	-	4,48	4,48	4,48	4,48
Dpev	27,6	27,6	27,6	27,6	27,6	27,6	-	27,6	27,6	27,6	27,6	27,6	-	-	27,6	27,6	27,6	27,6

0121																		
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd	**30**						**35**						**40**					
Pt	**32,0**	**38,3**	**44,7**	**47,3**	**51,2**	**57,7**	**31,4**	**37,5**	**43,8**	**46,2**	**50,0**	**56,3**	**30,8**	**36,8**	**42,8**	**45,2**	**48,8**	**54,8**
Qcd	5,53	6,63	7,73	8,18	8,85	9,98	5,44	6,50	7,58	8,01	8,66	9,76	5,34	6,38	7,42	7,83	8,46	9,51
Pcd	26,3	37,7	51,4	57,5	67,3	85,6	25,4	36,4	49,4	55,2	64,5	81,9	24,5	35,0	47,3	52,8	61,6	77,8
Pat	6,46	6,68	6,89	6,97	7,08	7,27	7,18	7,42	7,63	7,70	7,81	7,95	7,98	8,27	8,50	8,57	8,66	8,76
Pf	33,4	33,4	33,4	33,4	33,4	33,4	33,4	33,4	33,4	33,4	33,4	33,4	33,4	33,4	33,4	33,4	33,4	33,4
Qev	5,75	5,75	5,75	5,75	5,75	5,75	5,75	5,75	5,75	5,75	5,75	5,75	5,75	5,75	5,75	5,75	5,75	5,75
Dpev	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4	28,4
Tev	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**	**-5**	**0**	**5**	**7**	**10**	**15**
Tcd	**45**						**50**						**55**					
Pt	**30,2**	**35,9**	**41,7**	**44,0**	**47,4**	**53,2**	**-**	**35,1**	**40,6**	**42,8**	**46,0**	**51,4**	**-**	**-**	**39,5**	**41,5**	**44,5**	**49,4**
Qcd	5,24	6,25	7,25	7,65	8,24	9,24	-	6,11	7,07	7,45	8,01	8,94	-	-	6,88	7,24	7,77	8,62
Pcd	23,6	33,6	45,2	50,3	58,5	73,4	-	32,1	43,0	47,7	55,2	68,7	-	-	40,8	45,1	51,9	63,9
Pat	8,86	9,23	9,50	9,57	9,65	9,69	-	10,3	10,6	10,7	10,8	10,7	-	-	11,9	12,0	12,0	11,9
Pf	33,4	33,4	33,4	33,4	33,4	33,4	-	33,4	33,4	33,4	33,4	33,4	-	-	33,4	33,4	33,4	33,4
Qev	5,75	5,75	5,75	5,75	5,75	5,75	-	5,75	5,75	5,75	5,75	5,75	-	-	5,75	5,75	5,75	5,75
Dpev	28,4	28,4	28,4	28,4	28,4	28,4	-	28,4	28,4	28,4	28,4	28,4	-	-	28,4	28,4	28,4	28,4

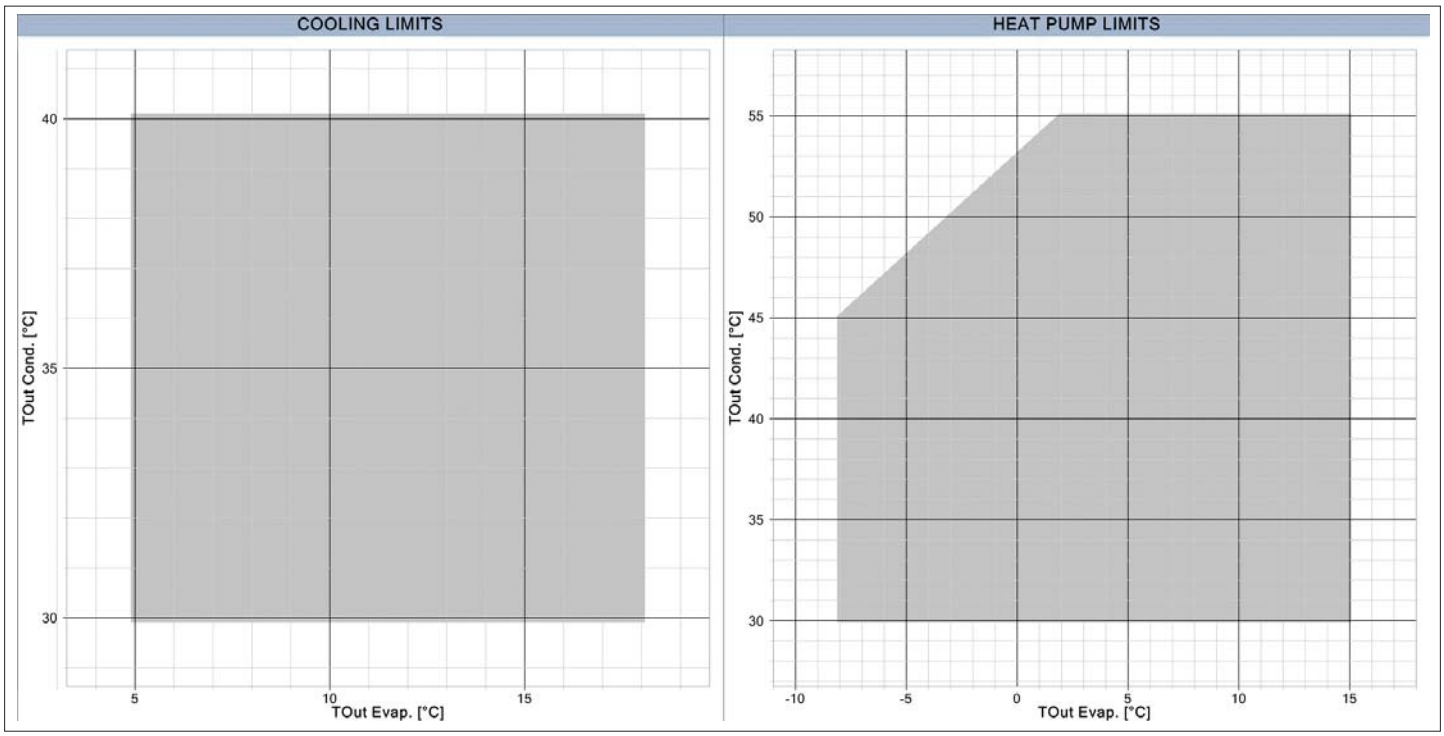
Tev [°C] - Source (side) heat exchanger output water temperature
Tcd (°C) - Plant (side) heating exchanger output water temperature
Pt (kW) - Heating capacity
Qcd (m³/h) - Plant (side) heating exchanger water flow
Dpcd (kPa) - Plant (side) heating exchanger pressure drop
Pat (kW) - Total power input
Pf (kW) - Cooling capacity
Qev (m³/h) - Source (side) heat exchanger water flow
Dpev (kPa) - Source (side) cooling exchanger pressure drop
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T

6. OPERATING LIMITS

BWR MTD2 230V



BWR MTD2 400V



- System circuit temperature difference (min/max) = 4/8°C
- Ground source circuit temperature difference in heating mode (min/max) = 3/5°C
- Ground source circuit temperature difference in cooling mode (min/max) = 5/8°C
- Maximum glycol content 40%

7. ETHYLENE GLYCOL MIXTURE

Ethylene glycol and water mixture, used as a heat-conveying fluid, cause a variation in unit performance. For correct data, use the factors indicated in the following tabel.

	Freezing point (°C)							
	0	-5	-10	-15	-20	-25	-30	-35
	Ethylene glycol percentage by weight							
	0	12%	20%	30%	35%	40%	45%	50%
cPf	1	0,985	0,98	0,974	0,97	0,965	0,964	0,96
cQ	1	1,02	1,04	1,075	1,11	1,14	1,17	1,2
cdp	1	1,07	1,11	1,18	1,22	1,24	1,27	1,3

cPf: cooling power correction factor
cQ: flow correction factor
cdp: pressure drop correction factor

For data concerning other kind of anti-freeze solutions (e,g, propylene glycol) please contact our Sale Department.

8. FOULING FACTORS

Performances are based on clean condition of tubes (fouling factor = 1). For different fouling values, performance should be adjusted using the correction factors shown in the following table.

FOULING FACTORS	EVAPORATOR			CONDENSER/RECOVERY			DESUPERHEATER
ff (m² °CW)	F1	FK1	KE [°C]	F2	FK2	KC [°C]	R3
0	1,000	1,000	0,0	1,000	1,000	0,0	1,000
1,80 x 10^{-5}	1,000	1,000	0,0	1,000	1,000	0,0	1,000
4,40 x 10^{-5}	1,000	1,000	0,0	0,990	1,030	1,0	0,990
8,80 x 10^{-5}	0,960	0,990	0,7	0,980	1,040	1,5	0,980
13,20 x 10^{-5}	0,944	0,985	1,0	0,964	1,050	2,3	0,964
17,20 x 10^{-5}	0,930	0,980	1,5	0,950	1,060	3,0	0,950

ff: fouling factors
f1 - f2: potential correction factors
fk1 - fk2: compressor power input correction factors
r3: capacity correction factors

KE: minimum condenser outlet temperature increase
KC: maximum condenser outlet temperature decrease

9. HYDRAULIC DATA

Water flow and pressure drop

Water flow in the heat exchangers is given by: Q=Px0,86/Dt
Q: water flow (m³/h)
Dt: difference between inlet and outlet water temp. (°C)
P: heat exchanger capacity (kW)

Pressure drop is given by: Dp= K x Q2/1000
Q: water flow (m³/h)
Dp: pressure drop (kPa)
K: unit size ratio

	PLANT SIDE COLD HEAT EXCHANGER					SOURCE SIDE HEAT EXCHANGER				AUXILIARY SIDE HEAT EXCHANGER			
SIZE BWR MTD2	K	Q min m³/h	Q max m³/h	C.A.S. dm³	C.a. min m³	K	Q min m³/h	C.A.S. dm³	Q max m³/h	K	Q min m³/h	C.A.S. dm³	Q max m³/h
0011 230V	9375	0,56	2,04	-	0,027	9375	0,2	-	1,74	-	-	-	-
0025 230V	7402	0,77	2,81	-	0,037	7402	0,27	-	2,35	-	-	-	-
0031 230V	7250	0,95	3,44	-	0,044	7250	0,34	-	2,97	-	-	-	-
0041 230V	5008	1,21	4,33	-	0,056	5008	0,43	-	3,77	-	-	-	-
0025 400V	7402	0,78	2,72	-	0,037	7402	0,26	-	2,42	-	-	-	-
0031 400V	7250	0,96	3,44	-	0,044	7250	0,33	-	2,93	-	-	-	-
0041 400V	5008	1,27	4,5	-	0,056	5008	0,44	-	3,93	-	-	-	-
0061 400V	2949	1,69	6,11	-	0,08	2949	0,57	-	5,16	-	-	-	-
0071 400V	2037	2,13	7,71	-	0,1	2037	0,71	-	6,39	-	-	-	-
0091 400V	1316	2,46	8,8	-	0,115	1316	0,82	-	7,42	-	-	-	-
0101 400V	1373	2,8	9,98	-	0,13	1373	0,94	-	8,55	-	-	-	-
0121 400V	860	3,59	12,84	-	0,17	860	1,2	-	10,74	-	-	-	-

Q min: minimum water flow admitted to the heat exchanger
Q max: maximum water flow admitted to the heat exchanger
C.a. min: minimum water content admitted in the plant, using traditional control logic
C.A.S.: heat exchanger water content

- - -

10. MINIMUM AND MAXIMUM SYSTEM WATER CONTENT

Minimum system water content
The minimum water content for the system shown in table 1 allows the number of compressor starts and stops to be limited.

Tab. 1	Size		0011	0025	0031	0041	0061	0071	0091	0101	0121
	Minimum water content	l	27	37	44	56	80	100	115	130	170

Maximum system water content
The heat pumps are fitted as standard with an expansion vessel and safety valve. The maximum system water content depends on the capacity of the expansion vessel (see **table 2**) and the calibration of the safety valve (see **table 3**).

Tab. 2	Size		0011	0025	0031	0041	0061	0071	0091	0101	0121
	Expansion vessel	l	2	2	2	2	5	5	5	8	8

Tab. 3	Size		0011	0025	0031	0041	0061	0071	0091	0101	0121
	Safety valve	bar	6	6	6	6	6	6	6	6	6

Table 4 shows an example of the maximum water content in the specified normal operating conditions.
If the volume of water in the system is higher, an additional, correctly sized expansion vessel is required.

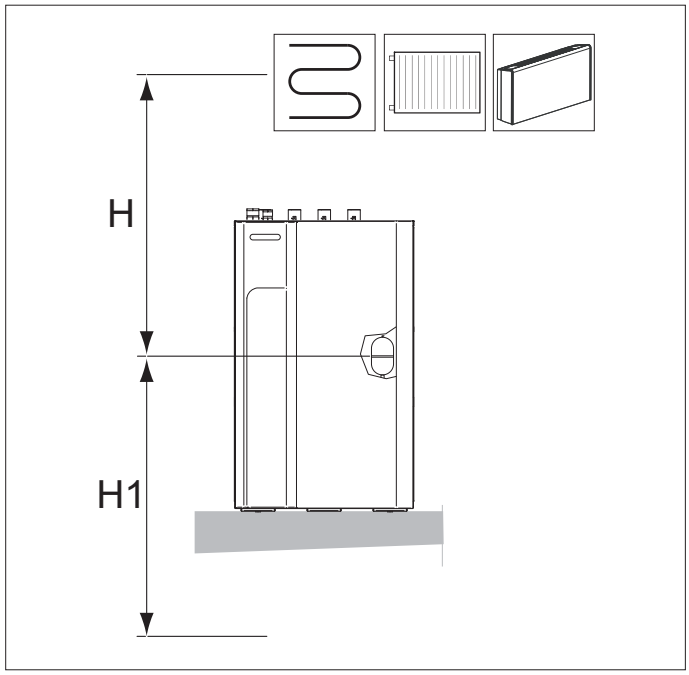
Tab. 4							
	System water temperature	**°C**	**20**				
	Hydraulic head	m	30	25	20	15	>12,25
	Expansion vessel pre-charge	bar	3,2	2,8	2,3	1,8	1,5
	Maximum water content	l	435	515	595	670	715
	System water temperature	**°C**	**35**				
	Hydraulic head	m	30	25	20	15	>12,25
	Expansion vessel pre-charge	bar	3,2	2,8	2,3	1,8	1,5
	Maximum water content	l	135	160	180	205	220
	System water temperature	**°C**	**45**				
	Hydraulic head	m	30	25	20	15	>12,25
	Expansion vessel pre-charge	bar	3,2	2,8	2,3	1,8	1,5
	Maximum water content	l	80	95	110	120	130
	System water temperature	**°C**	**55**				
	Hydraulic head	m	30	25	20	15	>12,25
	Expansion vessel pre-charge	bar	3,2	2,8	2,3	1,8	1,5
	Maximum water content	l	55	65	75	85	90

The data shown in the table refer to heat pumps with a 2-litre expansion vessel and a minimum water temperature of 4°C

Expansion vessel calibration
The expansion vessels are pre-charged to a standard pressure of 1 bar.
The pre-charge pressure is chosen depending on the maximum difference in height between the system terminal and the heat pump, as shown in the figure.

The maximum height must not exceed 55 metres due to the maximum vessel pre-charge pressure of 6 bars.

Make sure that the system terminal at the lowest point H1 can withstand the pressure of the water column at that point.



11. HYDRONIC UNIT

Standard system pump

Size	Pump power supply	Pf (1)	Q (1)	H (1)	Pt (2)	Q (2)	H (2)	F.L.I.	Pump
		kW	m³/h	kPa	kW	m³/h	kPa	kW	
BWR MTD2 0011ms	230v-50Hz-1Ph	7,10	1,22	54	5,4	0,93	62	0,2	SXM 32-50
BWR MTD2 0025ms	230v-50Hz-1Ph	9,80	1,69	57	7,3	1,26	69	0,21	SXM 32-60
BWR MTD2 0031ms	230v-50Hz-1Ph	12	2,06	81	9,2	1,58	96	0,41	SXM 32-80
BWR MTD2 0041ms	230v-50Hz-1Ph	15,1	2,60	75	11,7	2,01	92	0,41	SXM 32-80
BWR MTD2 0025t	230v-50Hz-1Ph	9,5	1,63	54	7,5	1,29	62	0,21	SXM 32-60
BWR MTD2 0031t	230v-50Hz-1Ph	12	2,06	81	9,1	1,57	96	0,41	SXM 32-80
BWR MTD2 0041t	230v-50Hz-1Ph	15,7	2,70	71	12,2	2,10	89	0,41	SXM 32-80
BWR MTD2 0061t	230v-50Hz-1Ph	21,3	3,66	61	16	2,75	85	0,41	SXM 32-80
BWR MTD2 0071t	230v-50Hz-1Ph	26,9	4,63	116	19,8	3,41	158	0,84	MULTI-H 402
BWR MTD2 0091t	230v-50Hz-1Ph	30,7	5,28	109	23	3,96	151	0,84	MULTI-H 402
BWR MTD2 0101t	230v-50Hz-1Ph	34,8	5,99	141	26,5	4,56	173	1,09	MULTI-H 802
BWR MTD2 0121t	230v-50Hz-1Ph	44,8	7,71	121	33,3	5,73	164	1,09	MULTI-H 802

Values refer to rated conditions:
Pf (1) Cooling capacity: Source heat exchanger water temperature (in/out) 30/35 °C System heat exchanger water temperature (in/out) 23/18 °C
Pt (2) Heating capacity: Source heat exchanger water temperature (in/out) 0/-3 °C System heat exchanger water temperature (in/out) 30/35 °C
Q (1)(2) System flow-rate
H (1) (2) Available pressure head in system circuit
F.L.I Maximum pump power consumption

Standard source pump

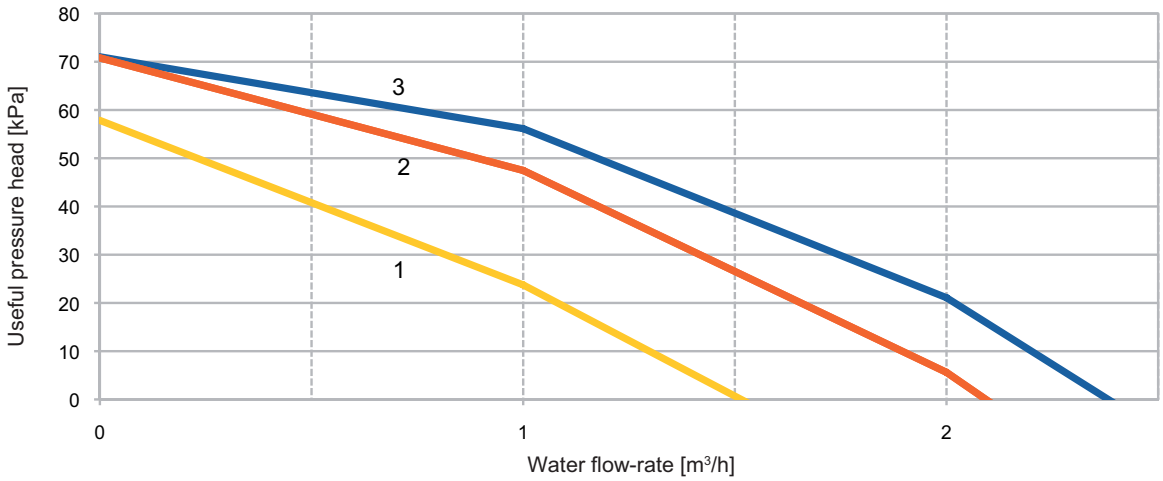
Size	Pump power supply	Pf (1)	Q (1)	H (1)	Pt (2)	Q (2)	H (2)	F.L.I.	Pump
		kW	m³/h	kPa	kW	m³/h	kPa	kW	
BWR MTD2 0011ms	230v-50Hz-1Ph	7,10	1,60	55	5,4	1,30	65	0,21	SXM 32-60
BWR MTD2 0025ms	230v-50Hz-1Ph	9,80	2,10	79	7,3	1,70	92	0,41	SXM 32-80
BWR MTD2 0031ms	230v-50Hz-1Ph	12	2,60	59	9,2	2,20	76	0,41	SXM 32-80
BWR MTD2 0041ms	230v-50Hz-1Ph	15,1	3,30	87	11,7	2,80	122	0,84	MULTI-H 202
BWR MTD2 0025t	230v-50Hz-1Ph	9,5	2,00	82	7,5	1,80	89	0,41	SXM 32-80
BWR MTD2 0031t	230v-50Hz-1Ph	12	2,60	59	9,1	2,20	76	0,41	SXM 32-80
BWR MTD2 0041t	230v-50Hz-1Ph	15,7	3,40	79	12,2	3,00	109	0,84	MULTI-H 202
BWR MTD2 0061t	230v-50Hz-1Ph	21,3	4,50	102	16	3,90	128	0,84	MULTI-H 402
BWR MTD2 0071t	230v-50Hz-1Ph	26,9	5,70	126	19,8	4,80	157	1,09	MULTI-H 802
BWR MTD2 0091t	230v-50Hz-1Ph	30,7	6,60	126	23	5,70	149	1,09	MULTI-H 802
BWR MTD2 0101t	230v-50Hz-1Ph	34,8	7,50	205	26,5	6,50	239	1,51	MULTI-H 803
BWR MTD2 0121t	230v-50Hz-1Ph	44,8	9,60	166	33,3	8,20	213	1,51	MULTI-H 803

Values refer to rated conditions:
Pf (1) Cooling capacity: Source heat exchanger water temperature (in/out) 30/35 °C System heat exchanger water temperature (in/out) 23/18 °C
Pt (2) Heating capacity: Source heat exchanger water temperature (in/out) 0/-3 °C System heat exchanger water temperature (in/out) 30/35 °C
Q (1)(2) Source flow-rate
H (1) (2) Available pressure head in source circuit
F.L.I Maximum pump power consumption

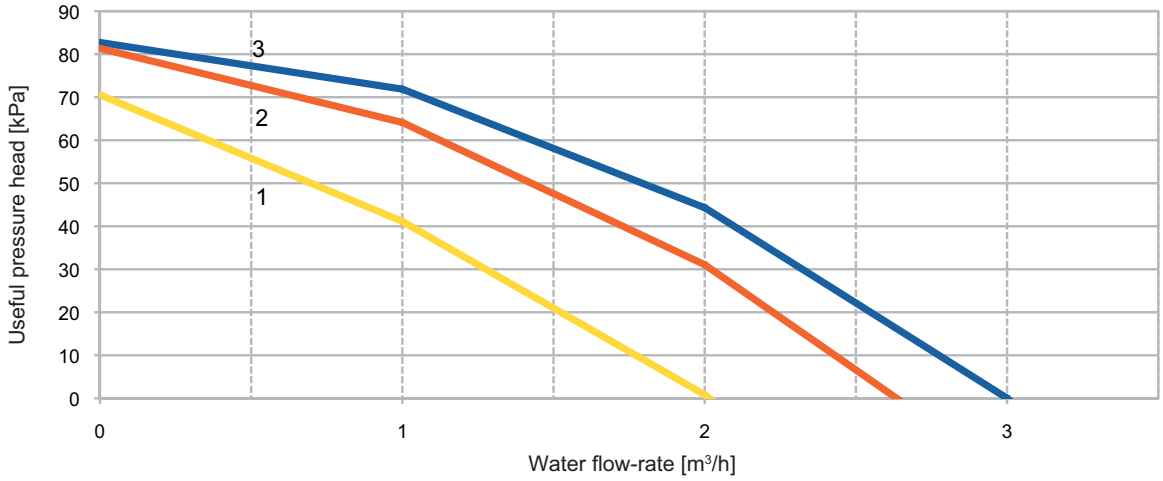
12. PUMP CURVES

SYSTEM PUMP CURVE

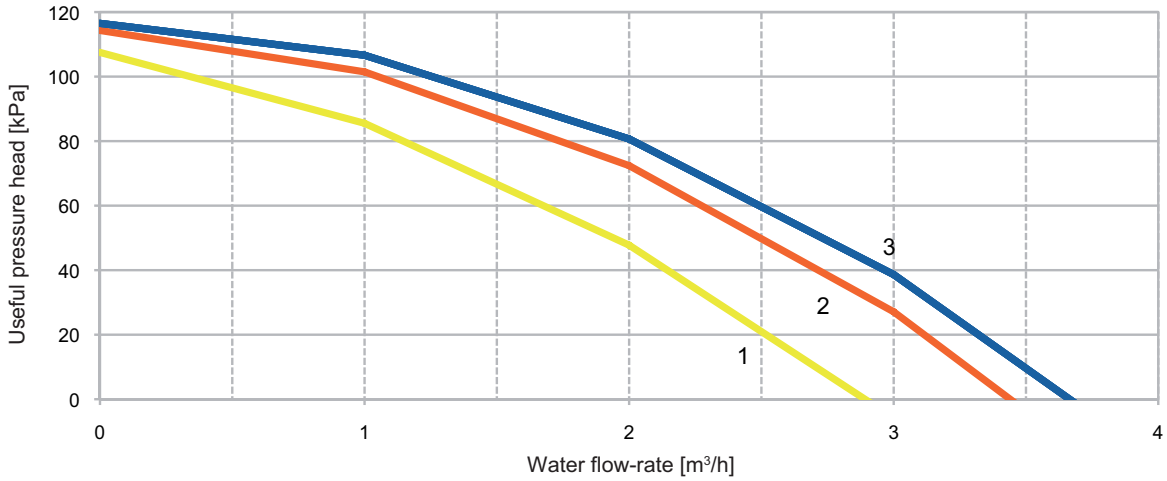
BWR MTD2 XE 0011 230-400V



BWR MTD2 XE 0025 230-400V



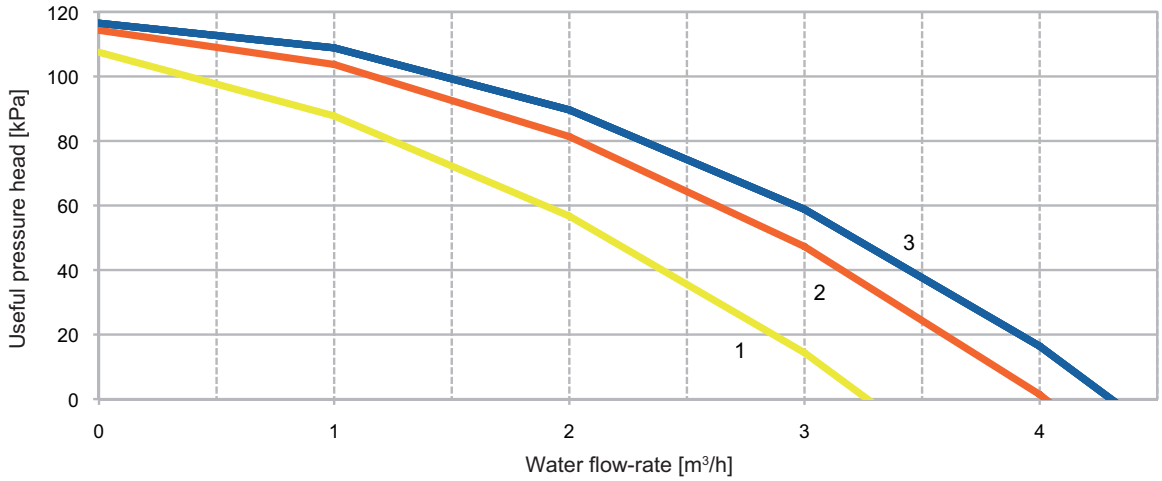
BWR MTD2 XE 0031 230-400V



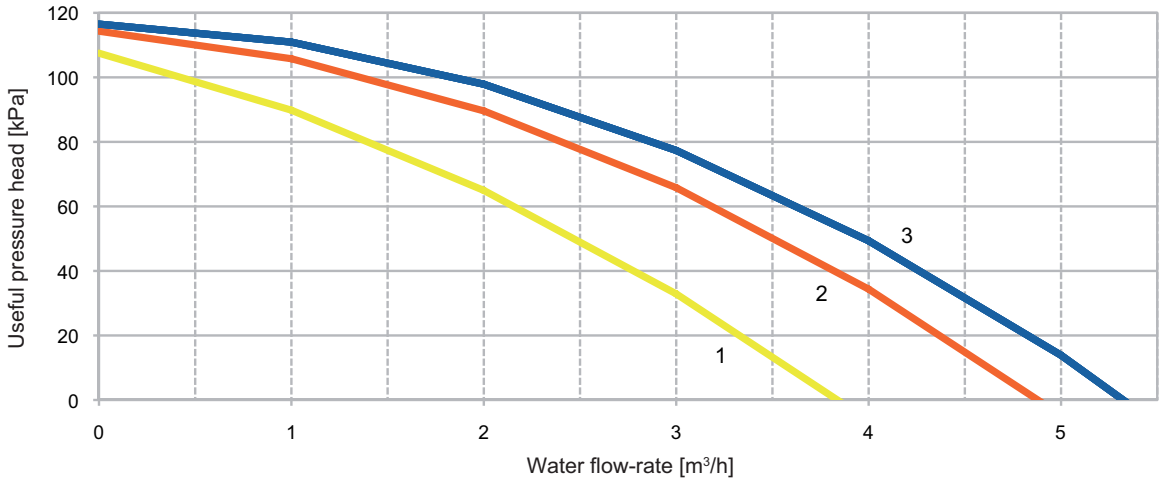
The pressure head refers to the values at the fittings.

SYSTEM PUMP CURVE

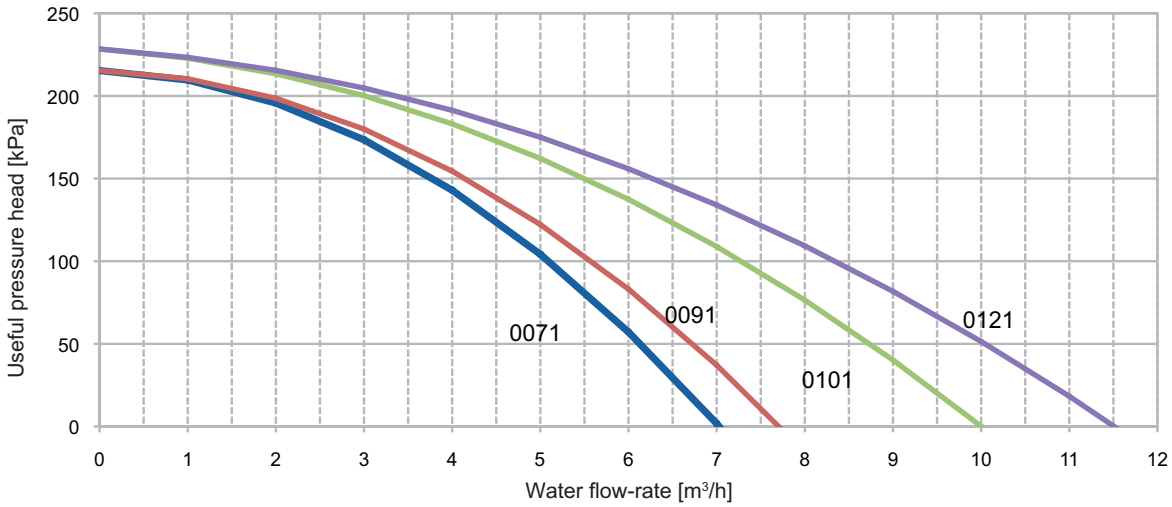
BWR MTD2 XE 0041 230-400V



BWR MTD2 XE 0061 400V



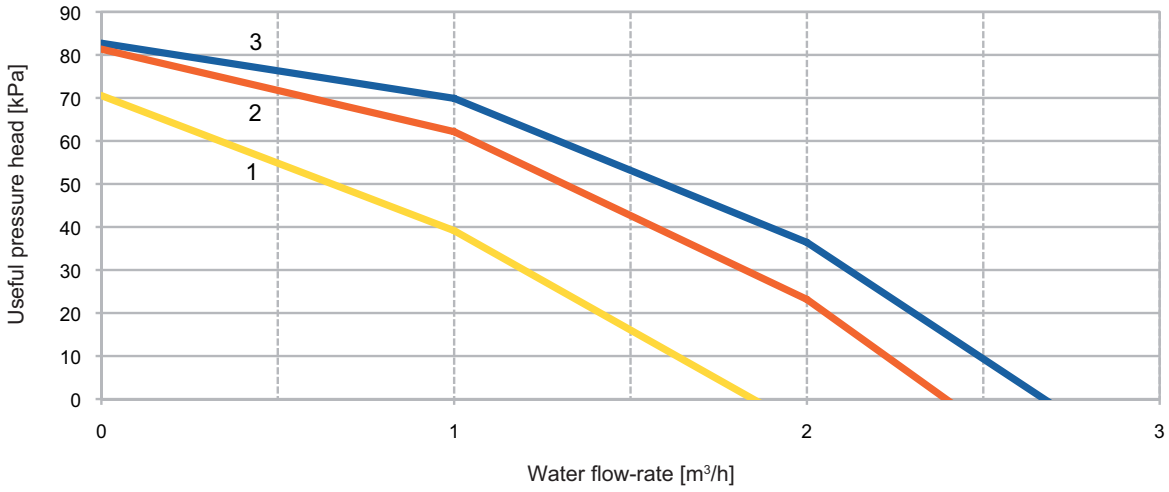
BWR MTD2 XE 0071-0091-0101-0121 400V



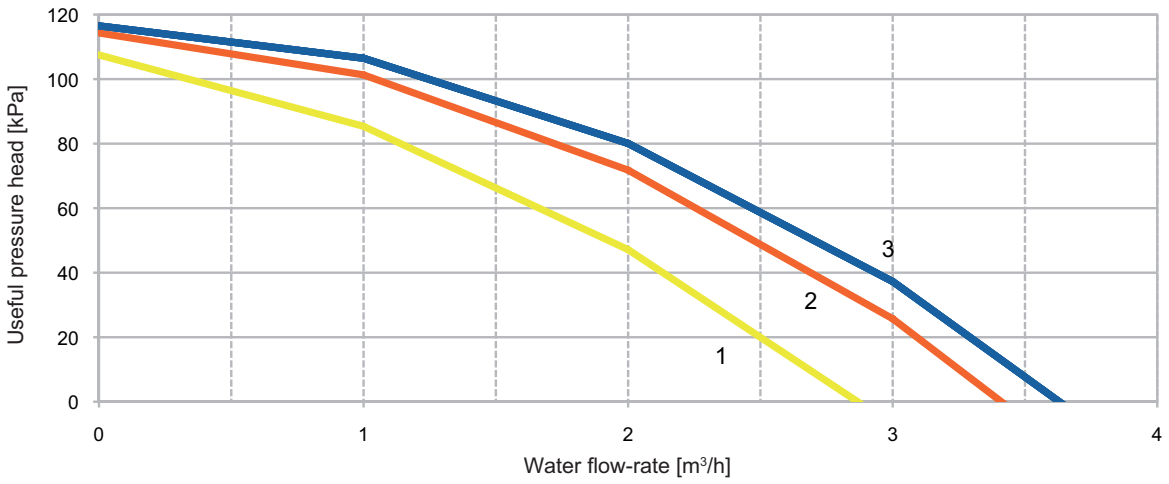
The pressure head refers to the values at the fittings.

SOURCE PUMP CURVE

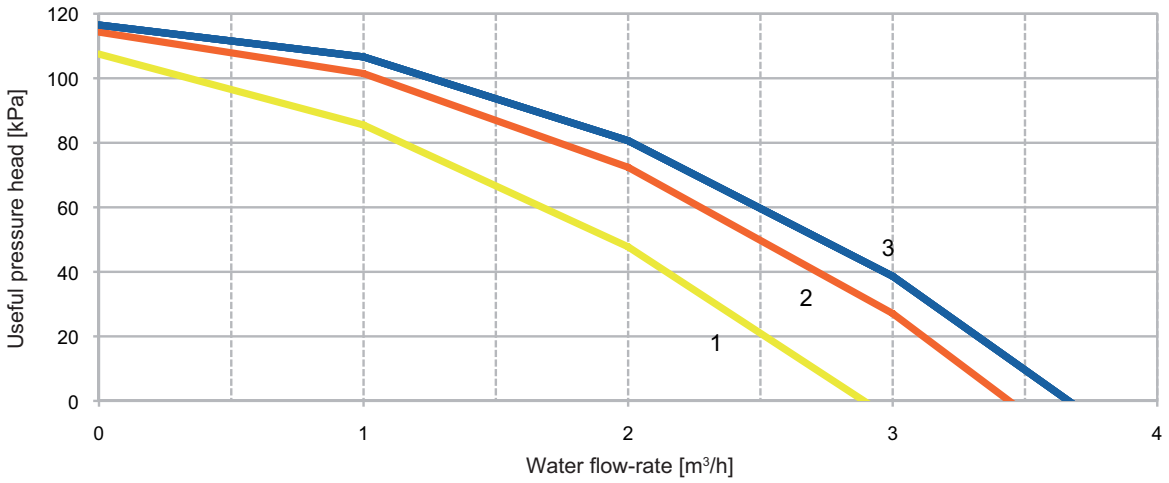
BWR MTD2 XE 0011 230-400V



BWR MTD2 XE 0025 230-400V

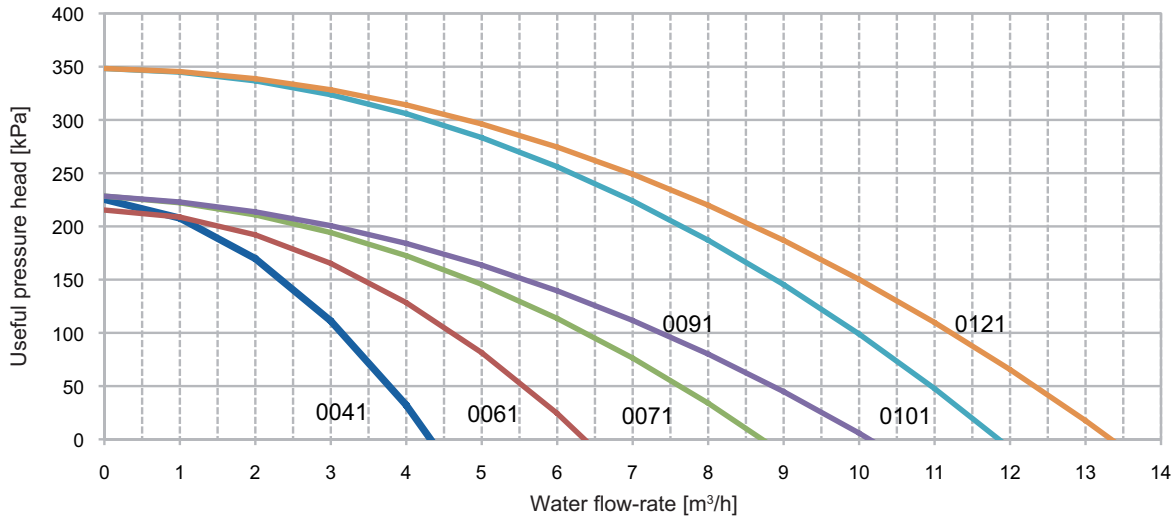


BWR MTD2 XE 0031 230-400V



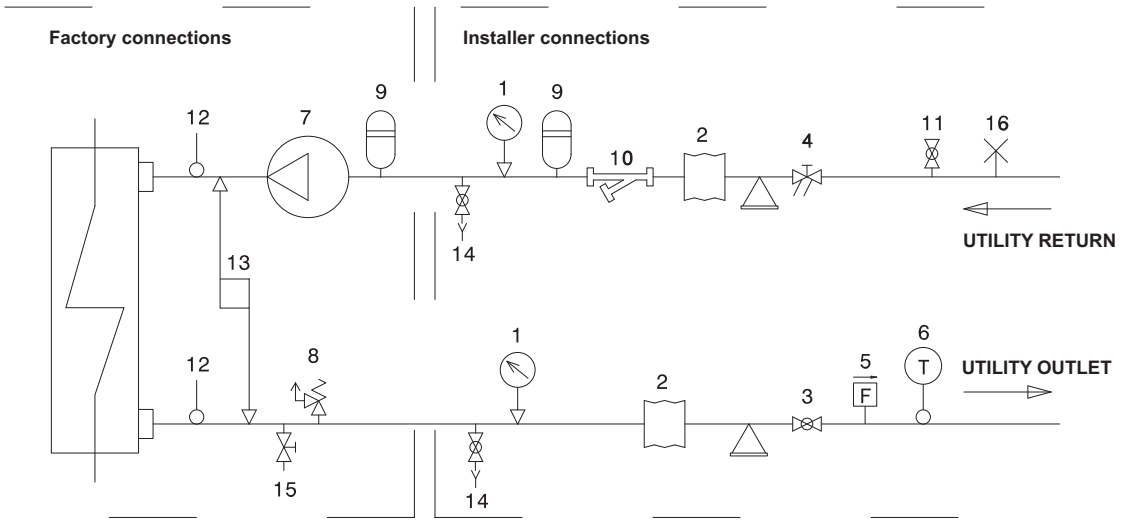
The pressure head refers to the values at the fittings.

BWR MTD2 XE 0041-0061-0071-0091-0101-0121 400V



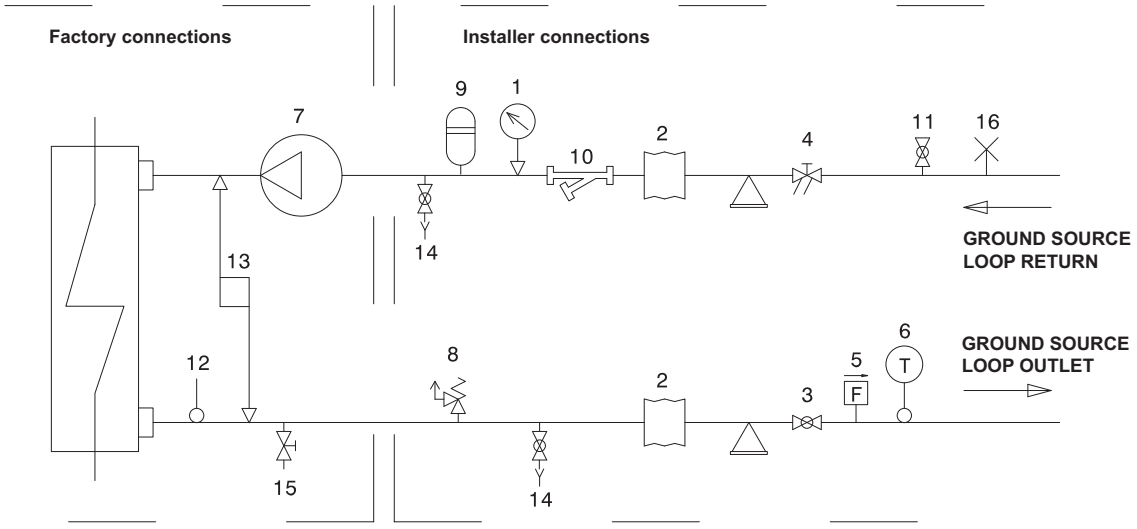
The pressure head refers to the values at the fittings.

13. UTILITY WATER CIRCUIT CONNECTION DIAGRAM



1	Pressure gauge	5	Flow switch	9	Expansion vessel	13	Differential pressure switch
2	Vibration damper joint	6	Thermometer	10	Mesh filter	14	Drain / cleaning washing valve
3	Shut off valve	7	Pump	11	Fill / top-up	15	Unit drain valve
4	Calibrating valve	8	Safety valve	12	Temperature sensor	16	System vent

14. WATER CIRCUIT CONNECTION DIAGRAM TO THE GROUND SOURCE CIRCUIT



1	Pressure gauge	5	Flow switch	9	Expansion vessel	13	Differential pressure switch
2	Vibration damper joint	6	Thermometer	10	Mesh filter	14	Drain / cleaning washing valve
3	Shut off valve	7	Pump	11	Fill / top-up	15	Unit drain valve
4	Calibrating valve	8	Safety valve	12	Temperature sensor	16	System vent

15. ELECTRICAL DATA AT MAXIMUM CONDITIONS ALLOWED (FULL LOAD)

SIZE	Maximum values						
	Compressors				Total (1)		
	n°	F.L.I. (kW)	F.L.A. (A)	L.R.A. (A)	F.L.I. (kW)	F.L.A. (A)	L.R.A. (A)
BWR MTD2 0011ms	**1**	2,73	12,8	26	2,73	12,8	26
BWR MTD2 0025ms	**1**	3,74	16,4	37	3,74	16,4	37
BWR MTD2 0031ms	**1**	4,65	21,7	44	4,65	21,7	44
BWR MTD2 0041ms	**1**	5,65	29,2	45	5,65	29,2	45
BWR MTD2 0025t	**1**	3,49	7,0	35	3,49	7	35
BWR MTD2 0031t	**1**	4,32	7,5	48	4,32	4,5	48
BWR MTD2 0041t	**1**	5,94	9,90	64	5,94	9,9	64
BWR MTD2 0061t	**1**	7,33	12,2	75	7,33	12,2	75
BWR MTD2 0071t	**1**	8,92	16,0	95	8,92	16	95
BWR MTD2 0091t	**1**	10,1	21,0	111	10,1	21	111
BWR MTD2 0101t	**1**	11,7	22,0	118	11,7	22	118
BWR MTD2 0121t	**1**	14,7	27,0	140	14,7	27	140

F.L.I.: Full load power
F.L.A.: Full load current
L.R.A.: Locked rotor amperes for single compressor
S.A.: Inrush current

(1) Safety values to be considered when cabling the unit for power supply and line-protections

Power supply: 230/1/50 400/3/50
Voltage tolerance: 10%
Maximum voltage unbalance: 3%

Give the typical operating conditions of units designed for outdoor installation, which can be associated (according to reference document IEC 60721) to the following classes:
- climatic conditions class 4K4H: air temperature range from -20 up to 55°C (*), relative humidity range from 4 up to 100%, with possible precipitations, at air pressure from 70 and 106 kPa and a maximum solar radiation of 1120 W/m^2
- special climatic conditions negligible
- biological conditions class 4B1 and 4C2: locations in a generic urban area
- mechanically active substances class 4S2: locations in areas with sand or dust representative of urban areas
- mechanical conditions class 4M1: locations protected from significant vibrations or shocks

The required protection level for safe operation, according to reference document IEC 60529, is IP43XW (protection against access, to the most critical unit's parts, of external devices with diameter larger than 1 mm and rain).
The unit can be considered IP44XW protected, i.e. protected against access of external devices (with diameter larger than 1 mm) and water in general.

(*) for the unit's operating limits, see "selection limits" section

16. FULL LOAD SOUND LEVEL

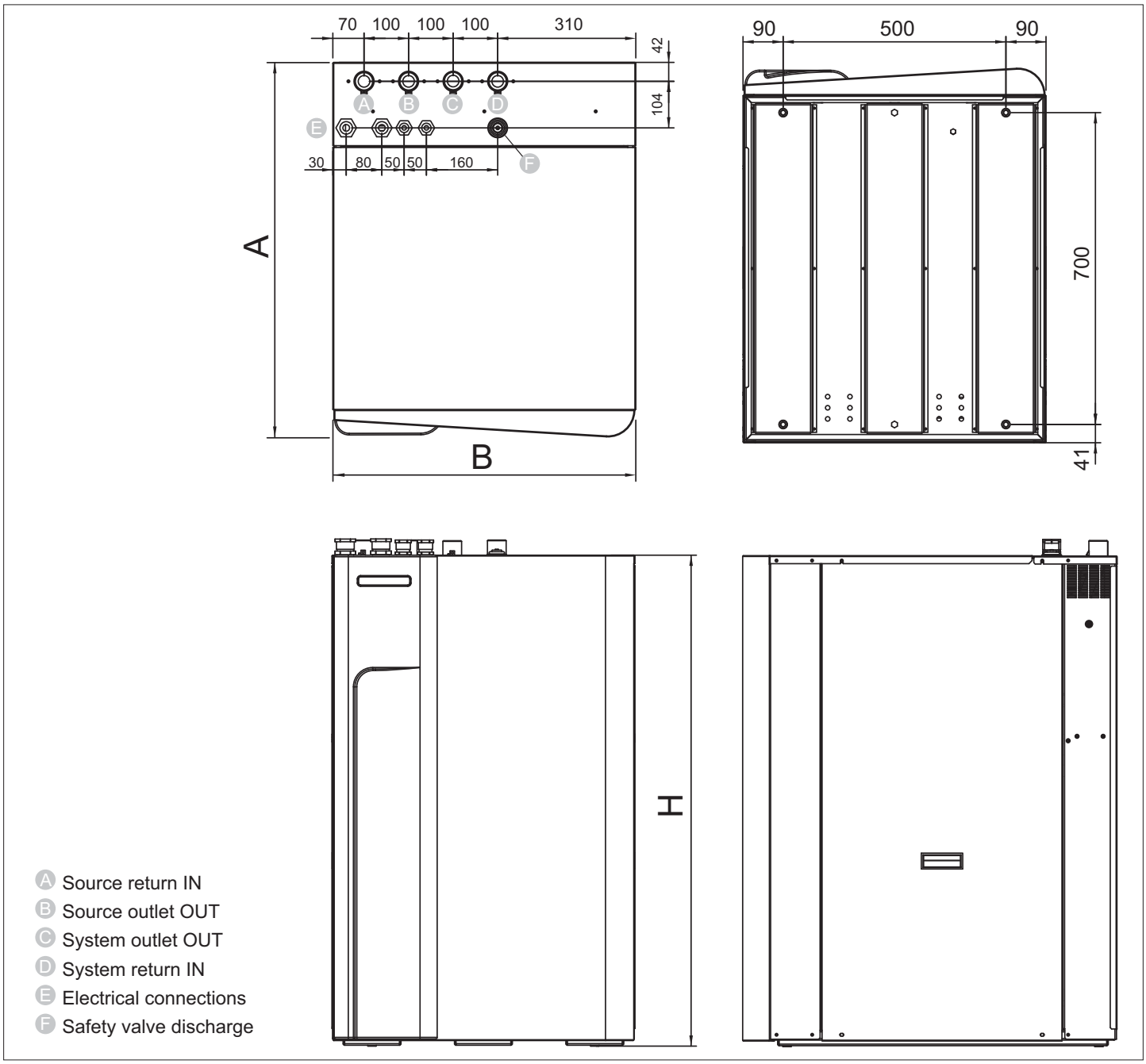
SOUND POWER									
SIZE	Octave band [Hz]								Total sound level
	63	125	250	500	1000	2000	4000	8000	
	Sound power level dB(A)								
BWR MTD2 0011ms	60	61	56	48	47	37	29	34	52
BWR MTD2 0025ms	61	62	57	49	48	38	30	35	53
BWR MTD2 0031ms	61	62	57	49	48	38	30	35	53
BWR MTD2 0041ms	62	63	60	55	54	48	41	36	58
BWR MTD2 0025t	61	62	57	49	48	38	30	35	53
BWR MTD2 0031t	61	62	57	49	48	38	30	35	53
BWR MTD2 0041t	62	63	60	55	54	48	41	36	58
BWR MTD2 0061t	63	64	61	56	55	49	42	37	59
BWR MTD2 0071t	64	65	68	63	62	56	49	42	66
BWR MTD2 0091t	64	65	68	63	62	56	49	42	66
BWR MTD2 0101t	68	69	72	67	66	60	53	46	70
BWR MTD2 0121t	68	69	72	67	66	60	53	46	70

Working conditions
Plant (side) cooling exchanger water (in/out) 12/7 °C
Source (side) heat exchanger water (in/out) 30/35 °C
Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units
Such certification refers specifically to the sound Power Level in dB(A). This is therefore the only acoustic data to be considered as binding.

SOUND PRESSURE LEVEL									
SIZE	Octave band [Hz] at 1 m								Total sound level
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level dB(A)								
BWR MTD2 0011ms	45	46	41	33	32	22	14	19	37
BWR MTD2 0025ms	46	47	42	34	33	23	15	20	38
BWR MTD2 0031ms	46	47	42	34	33	23	15	20	38
BWR MTD2 0041ms	47	48	45	40	39	33	26	21	43
BWR MTD2 0025t	46	47	42	34	33	23	15	20	38
BWR MTD2 0031t	46	47	42	34	33	23	15	20	38
BWR MTD2 0041t	47	48	45	40	39	33	26	21	43
BWR MTD2 0061t	48	49	46	41	40	34	27	22	44
BWR MTD2 0071t	49	50	53	48	47	41	34	27	51
BWR MTD2 0091t	49	50	53	48	47	41	34	27	51
BWR MTD2 0101t	53	54	57	52	51	45	38	31	55
BWR MTD2 0121t	53	54	57	52	51	45	38	31	55

Working conditions
Plant (side) cooling exchanger water (in/out) 12/7 °C
Source (side) heat exchanger water (in/out) 30/35 °C
Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units

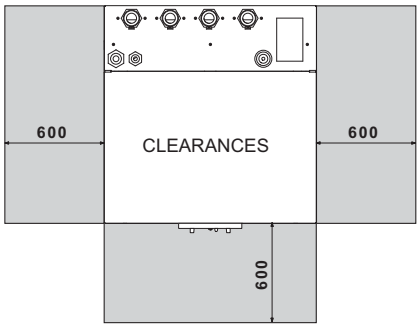
17. DIMENSIONAL DRAWINGS

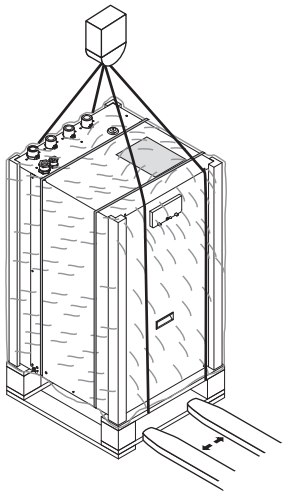


SIZE	DIMENSIONS AND WEIGHTS				CLEARANCE				PLANT SIDE HEAT EXCHANGER		SOURCE SIDE HEAT EXCHANGER		AUXILIARY SIDE HEAT EXCHANGER	
	A	B	H	WEIGHT	R1	R2	R3	R4	IN/OUT		IN/OUT		IN/OUT	
	[mm]	[mm]	[mm]	[kg]	[mm]	[mm]	[mm]	[mm]	TYPE	Ø	TYPE	Ø	TYPE	Ø
BWR MTD2 0011ms	845	680	1105	188	0	600	600	600	GAS	1" G M	-	-	-	-
BWR MTD2 0025ms	845	680	1105	190	0	600	600	600	GAS	1" G M	-	-	-	-
BWR MTD2 0031ms	845	680	1105	195	0	600	600	600	GAS	1" G M	-	-	-	-
BWR MTD2 0041ms	845	680	1105	210	0	600	600	600	GAS	1" G M	-	-	-	-

SIZE	DIMENSIONS AND WEIGHTS				CLEARANCE				PLANT SIDE HEAT EXCHANGER		SOURCE SIDE HEAT EXCHANGER		AUXILIARY SIDE HEAT EXCHANGER	
	A	B	H	WEIGHT	R1	R2	R3	R4	IN/OUT		IN/OUT		IN/OUT	
	[mm]	[mm]	[mm]	[kg]	[mm]	[mm]	[mm]	[mm]	TYPE	Ø	TYPE	Ø	TYPE	Ø
BWR MTD2 0025t	845	680	1105	190	0	600	600	600	GAS	1" G M	-	-	-	-
BWR MTD2 0031t	845	680	1105	195	0	600	600	600	GAS	1" G M	-	-	-	-
BWR MTD2 0041t	845	680	1105	210	0	600	600	600	GAS	1" G M	-	-	-	-
BWR MTD2 0061t	845	680	1105	225	0	600	600	600	GAS	1"1/4 G M	-	-	-	-
BWR MTD2 0071t	845	680	1105	230	0	600	600	600	GAS	1"1/4 G M	-	-	-	-
BWR MTD2 0091t	845	680	1105	245	0	600	600	600	GAS	1"1/4 G M	-	-	-	-
BWR MTD2 0101t	845	680	1105	250	0	600	600	600	GAS	1"1/4 G M	-	-	-	-
BWR MTD2 0121t	845	680	1105	270	0	600	600	600	GAS	1"1/4 G M	-	-	-	-

18. CLEARANCES - HOISTING - SYMBOLS





WARNING
Electrical current!

WARNING
Sharp surface!

WARNING
Fans!

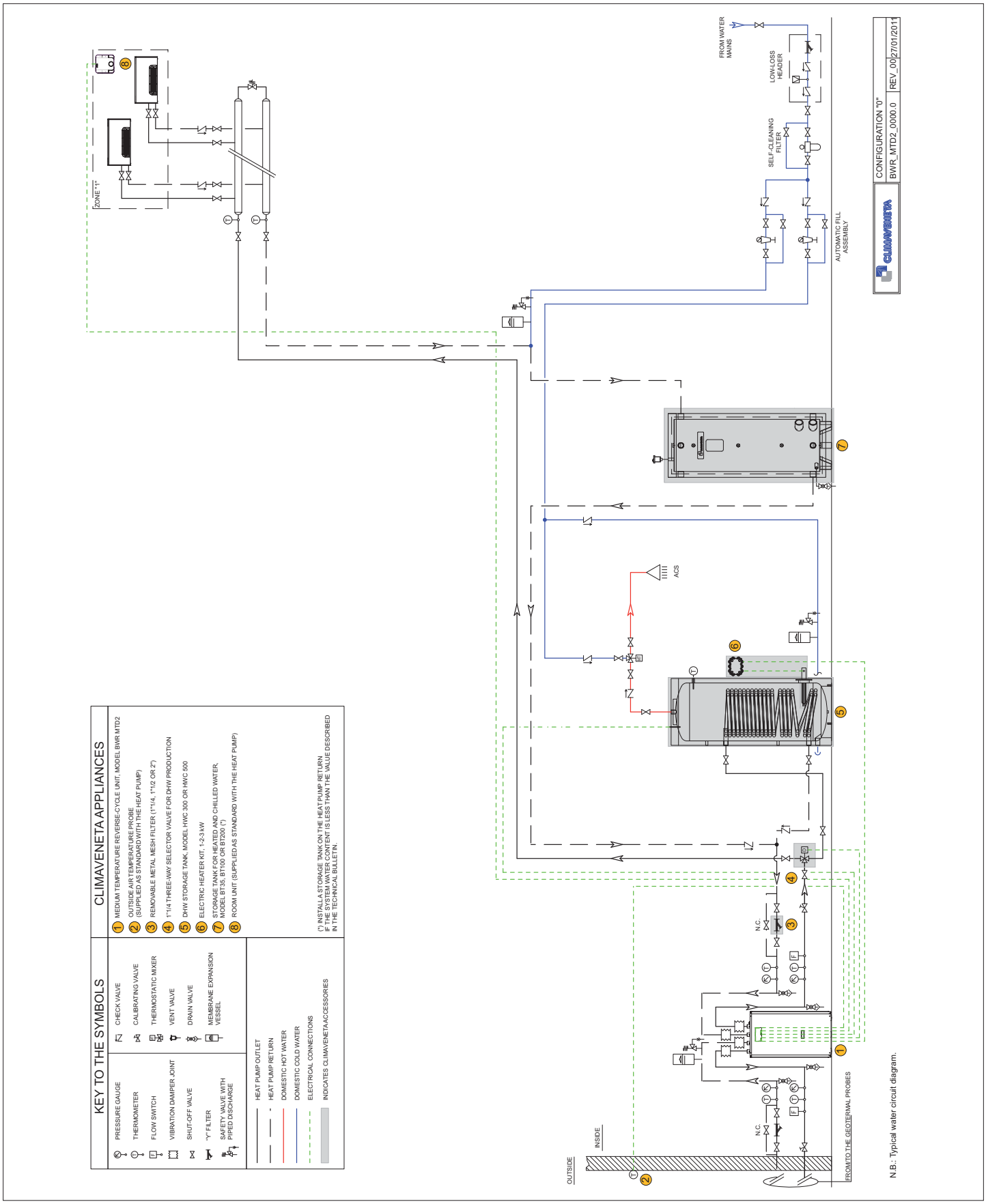
HOISTING INSTRUCTIONS

- Make sure all the panels are securely fastened before handling the unit.
- Before hoisting, check the weight of the unit on the CE rating label.
- Use all of the hoisting points indicated, and no others,
- Use equal length cables or slings.
- Use a spreader bar (not included)
- Handle the unit with care and without sudden or jerky movements.

19. OPERATING DIAGRAMS

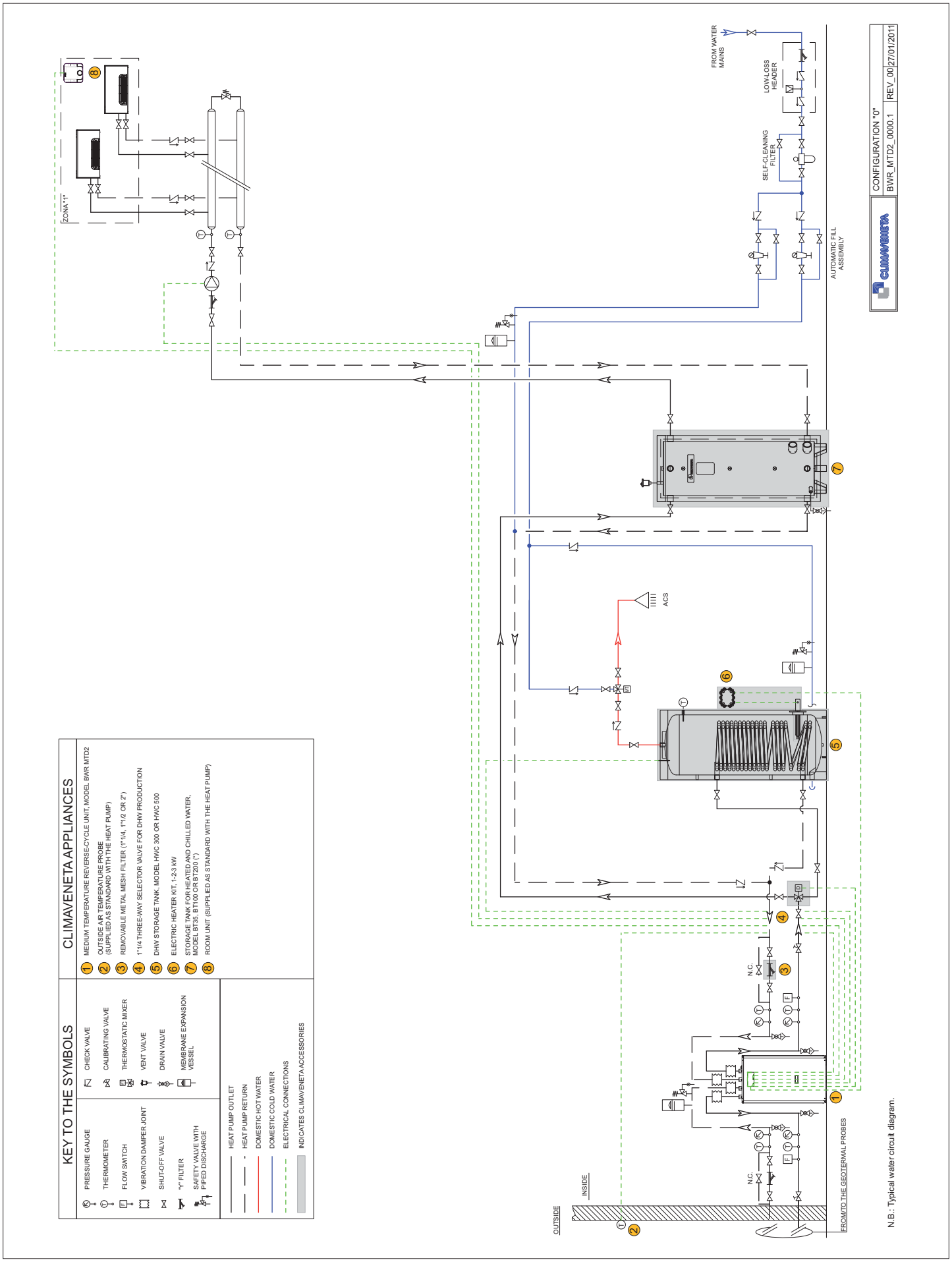
Heat pump connection to the system without low-loss header. Make sure the useful pressure head of the circulating pump on the unit is sufficient for the pressure drop in the system. If the minimum system content does not reach values shown in this manual, install an additional storage tank on the heat pump return pipe. No system configurations are required.

Water circuit diagram


CLIMAVENETA APPLIANCES
1 MEDIUM TEMPERATURE REVERSE-CYCLE UNIT, MODEL BWR MTD2
2 OUTSIDE AIR TEMPERATURE PROBE (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
3 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
4 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
5 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
6 ELECTRIC HEATER KIT, 1-2-3 kW
7 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200 (*)
8 ROOM UNIT (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
(*) INSTALL A STORAGE TANK ON THE HEAT PUMP RETURN IF THE SYSTEM WATER CONTENT IS LESS THAN THE VALUE DESCRIBED IN THE TECHNICAL BULLETIN.
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
FROM WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
CONFIGURATION "0"
BWR_MTD2_0000.0
REV_00
27/01/2011
ZONE "1"
ACS
N.C.
N.C.
INSIDE
OUTSIDE
FROM/TO THE GEOTERMAL PROBES
N.B.: Typical water circuit diagram.

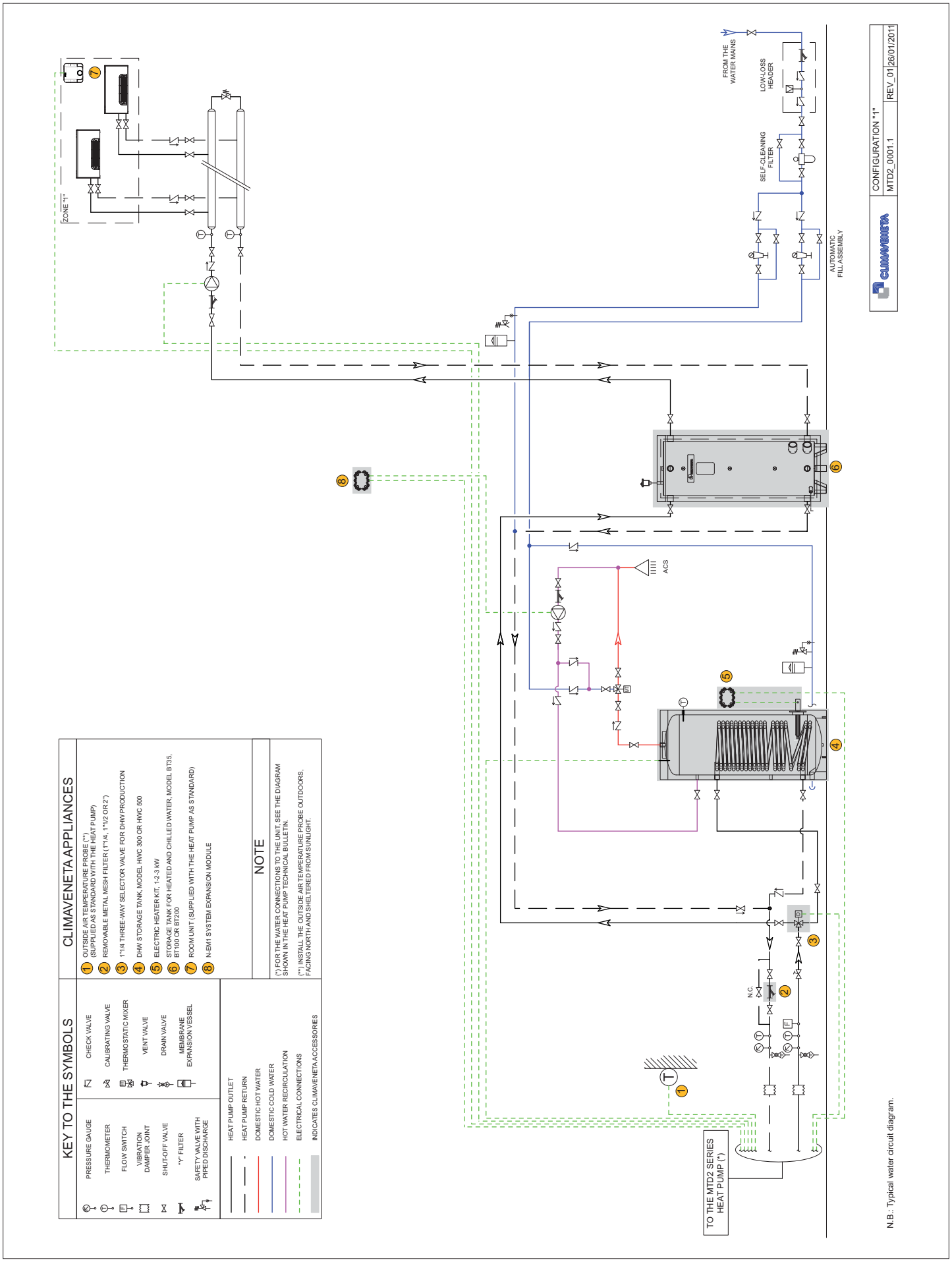
System number 0

Water circuit diagram



Water circuit diagram

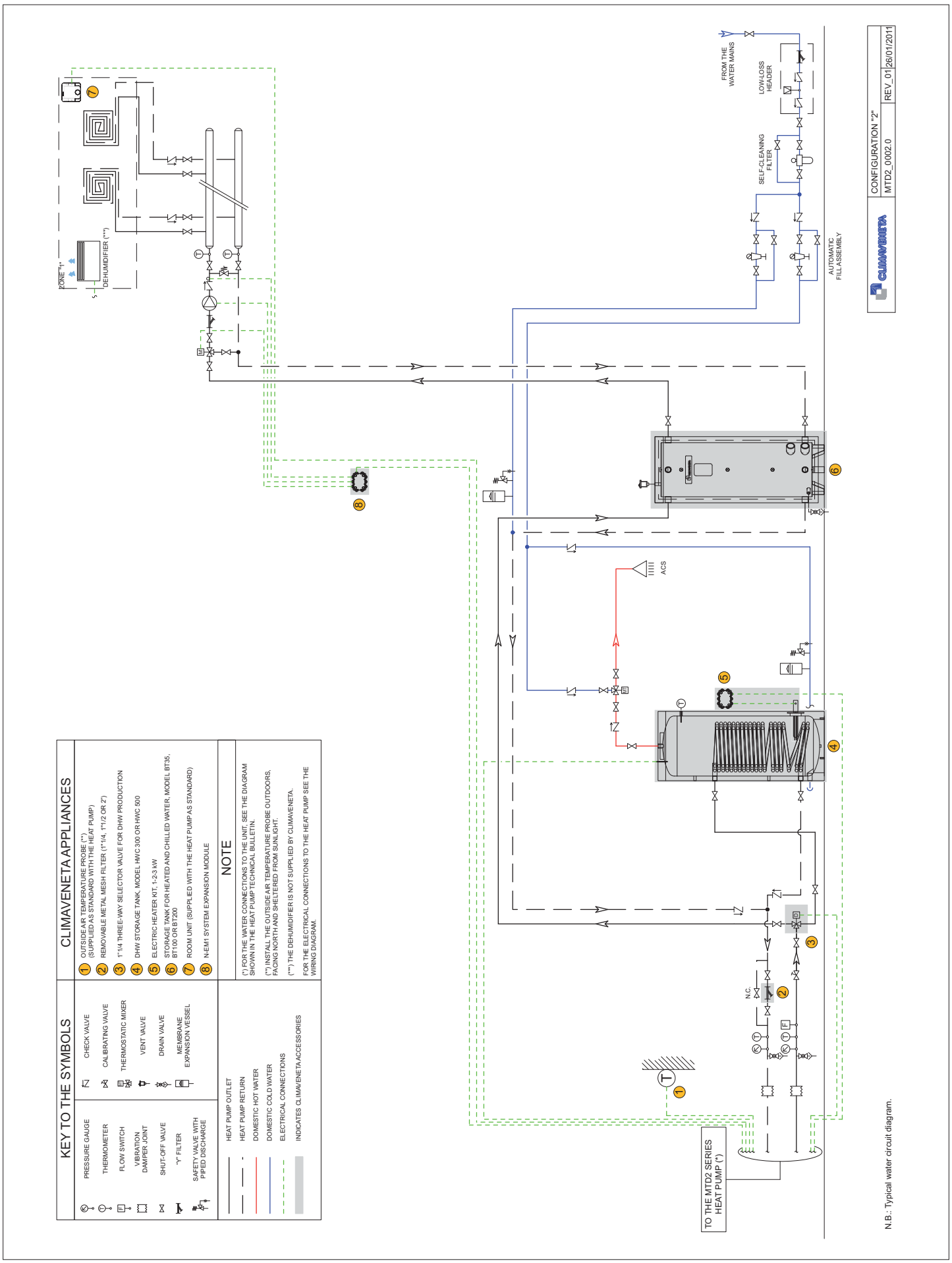
Configuration number 1 (parameter 0101= 1)


CONFIGURATION "1"
MTD2_0001.1
REV_01 26/01/2011
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "1"
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
HOT WATER RECIRCULATION
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
1 OUTSIDE AIR TEMPERATURE PROBE (**) (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.

N.B.: Typical water circuit diagram.

Water circuit diagram

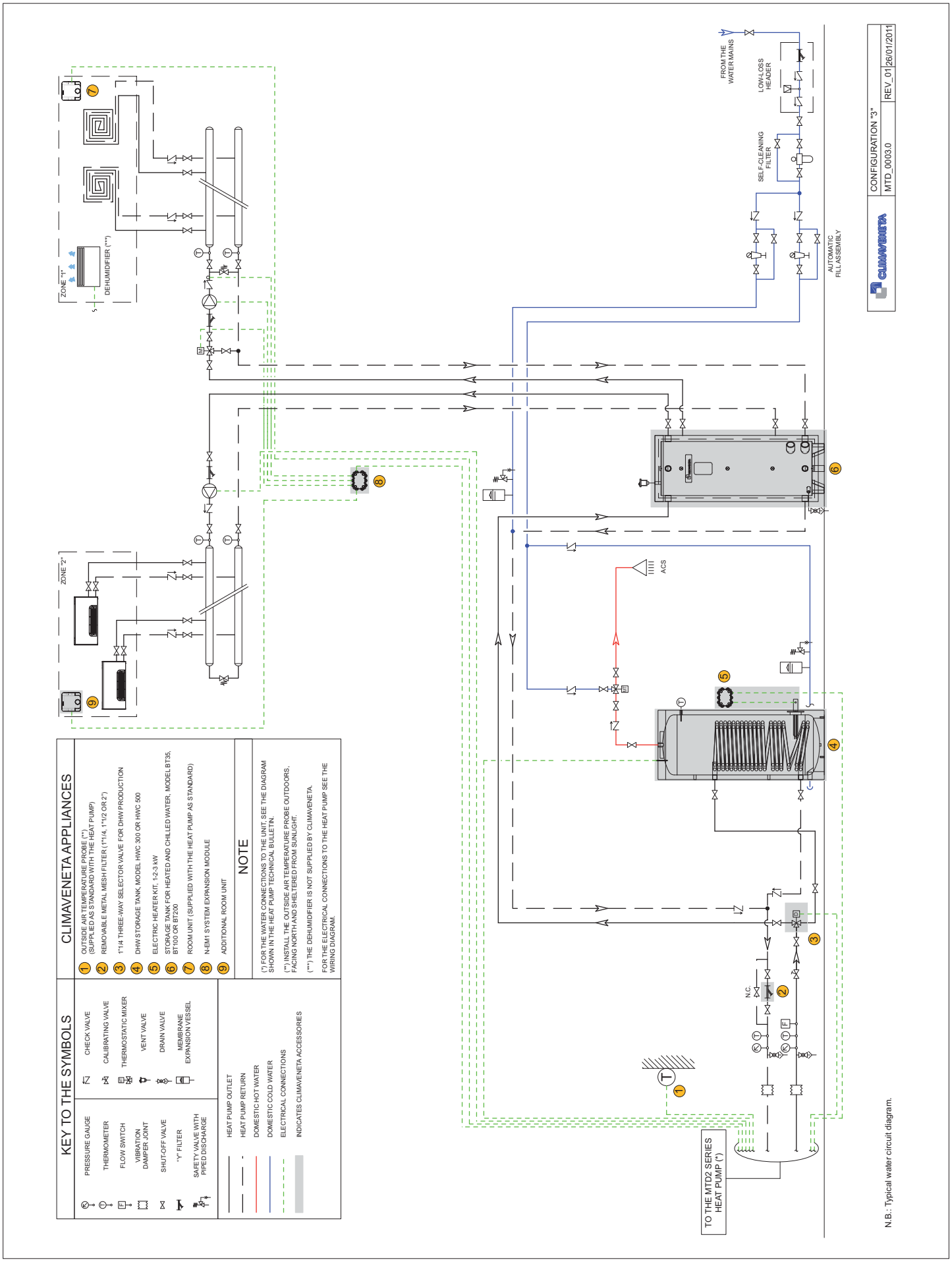
Configuration number 2 (parameter 0101= 2)


CONFIGURATION "2"
MTD2_0002.0
REV_01 26/01/2011
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "1"
DEHUMIDIFIER (**)
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
1 OUTSIDE AIR TEMPERATURE PROBE (**) (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.
(***) THE DEHUMIDIFIER IS NOT SUPPLIED BY CLIMAVENETA.
FOR THE ELECTRICAL CONNECTIONS TO THE HEAT PUMP SEE THE WIRING DIAGRAM.

N.B.: Typical water circuit diagram.

Water circuit diagram

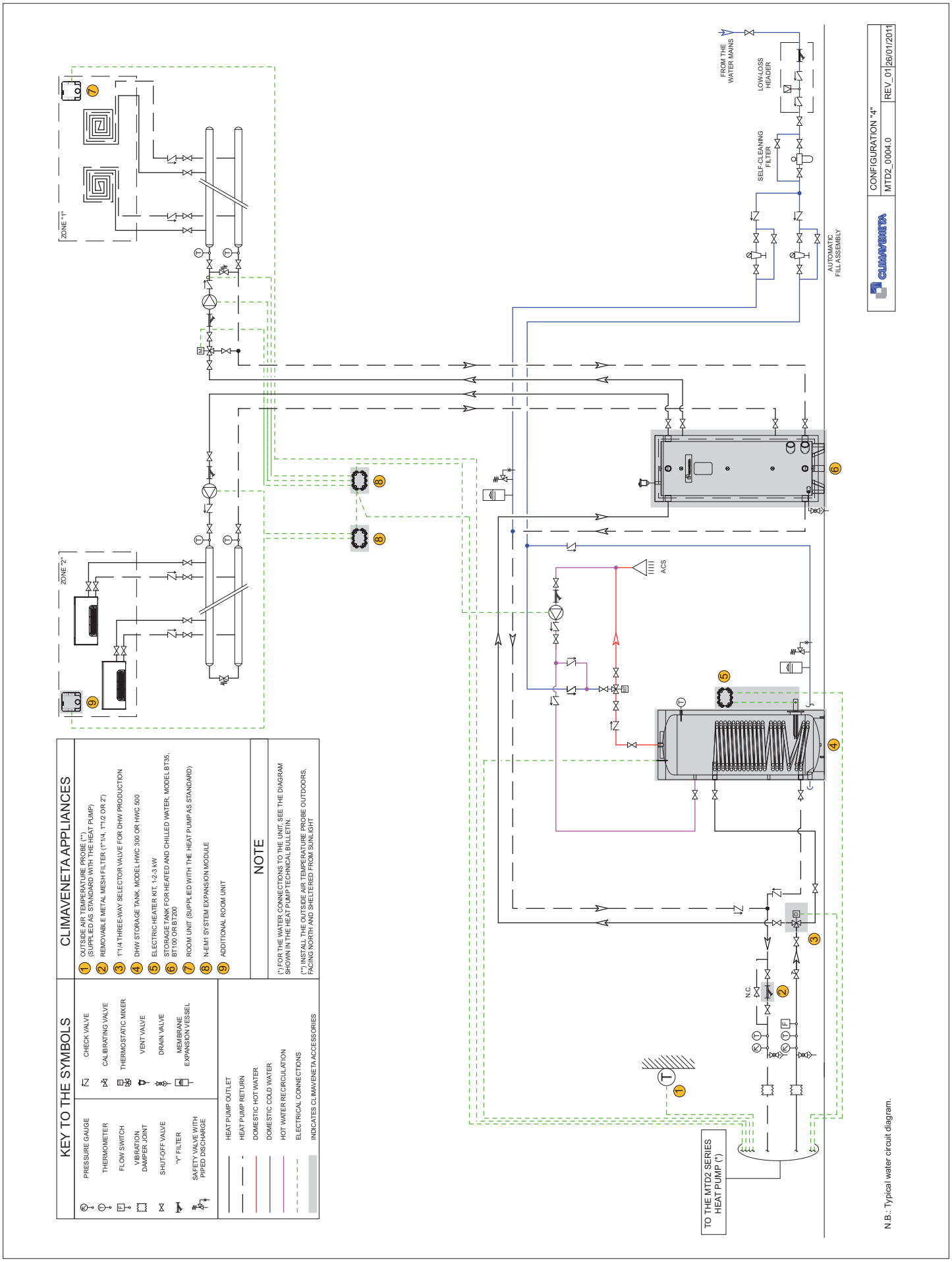
Configuration number 3 (parameter 0101= 3)


CONFIGURATION "3"
MTD_0003.0
REV_01 26/01/2011
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "1"
DEHUMIDIFIER (***)
ZONE "2"
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
1 OUTSIDE AIR TEMPERATURE PROBE (**) (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
9 ADDITIONAL ROOM UNIT
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.
(***) THE DEHUMIDIFIER IS NOT SUPPLIED BY CLIMAVENETA.
FOR THE ELECTRICAL CONNECTIONS TO THE HEAT PUMP SEE THE WIRING DIAGRAM.

N.B.: Typical water circuit diagram.

Water circuit diagram

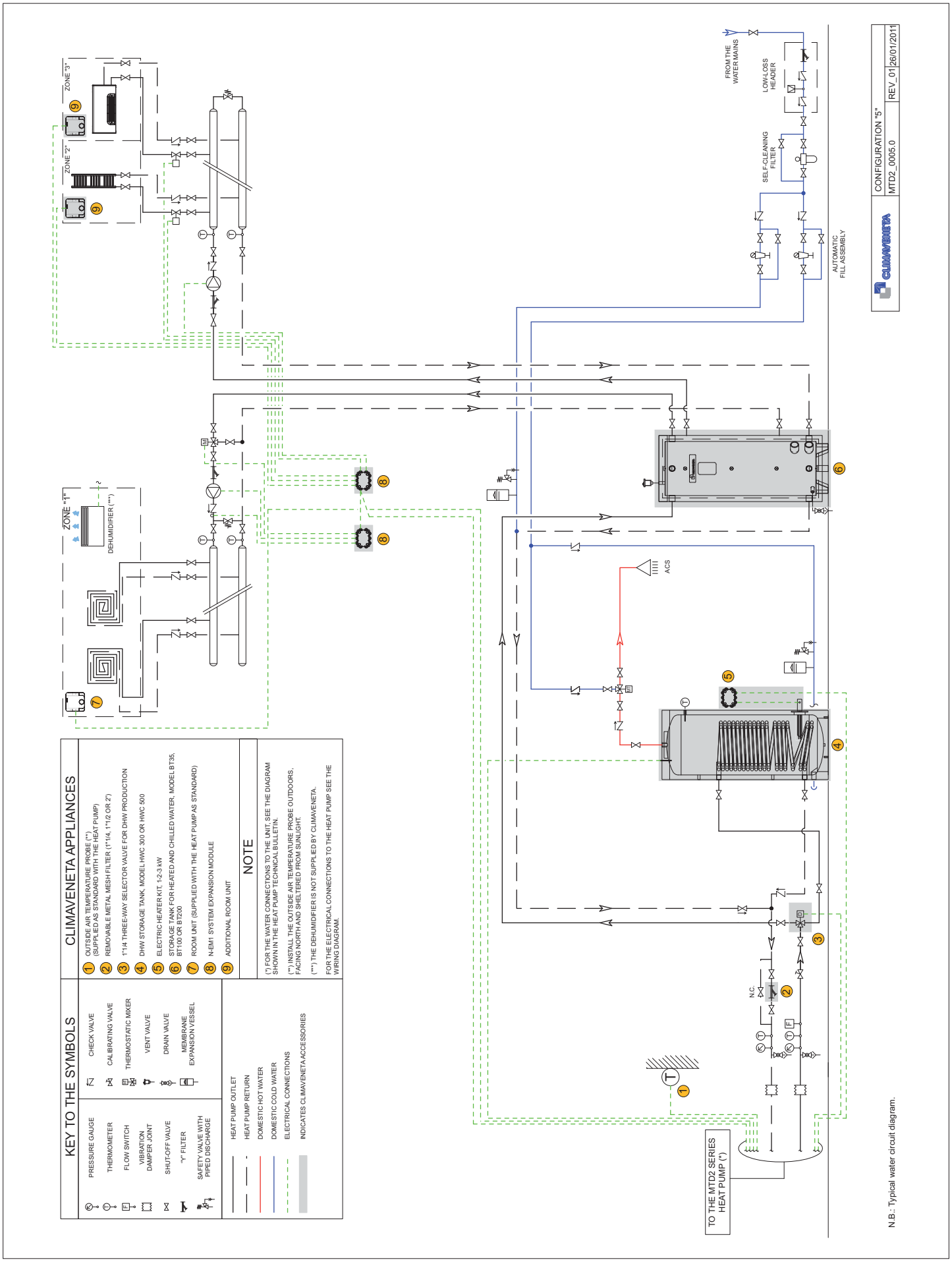
Configuration number 4 (parameter 0101= 4)


CONFIGURATION "4"
MTD2_0004.0
REV_01
26/01/2011
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "1"
ZONE "2"
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
HOT WATER RECIRCULATION
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
1 OUTSIDE AIR TEMPERATURE PROBE (**) (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
9 ADDITIONAL ROOM UNIT
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT

N.B.: Typical water circuit diagram.

Water circuit diagram

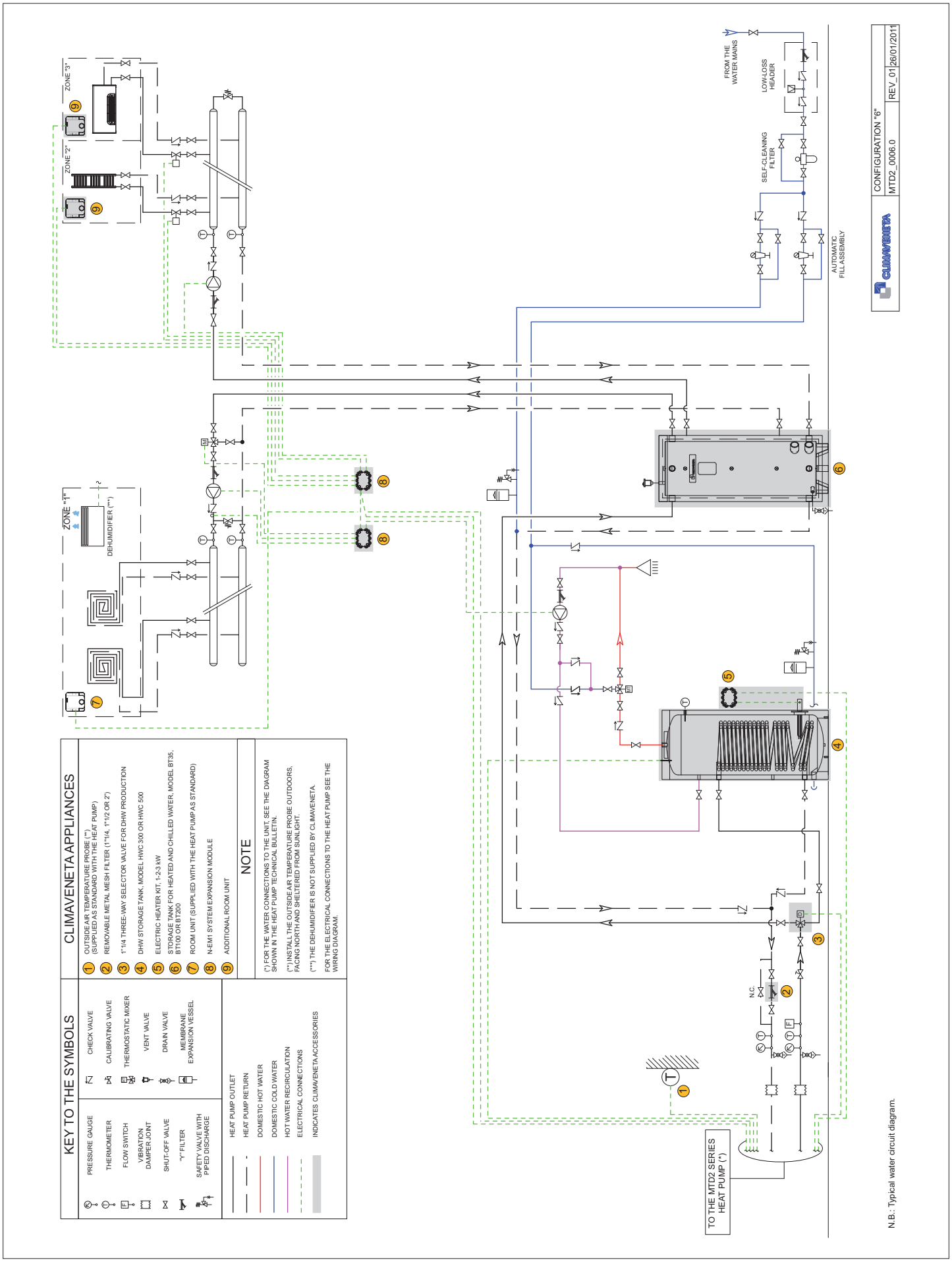
Configuration number 5 (parameter 0101= 5)


CONFIGURATION "5"
MTD2_0005.0
REV_01|26/01/2011
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "3"
ZONE "2"
ZONE "1"
DEHUMIDIFIER (***)
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
1 OUTSIDE AIR TEMPERATURE PROBE (*) (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
9 ADDITIONAL ROOM UNIT
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.
(***) THE DEHUMIDIFIER IS NOT SUPPLIED BY CLIMAVENETA.
FOR THE ELECTRICAL CONNECTIONS TO THE HEAT PUMP SEE THE WIRING DIAGRAM.

N.B.: Typical water circuit diagram.

Water circuit diagram

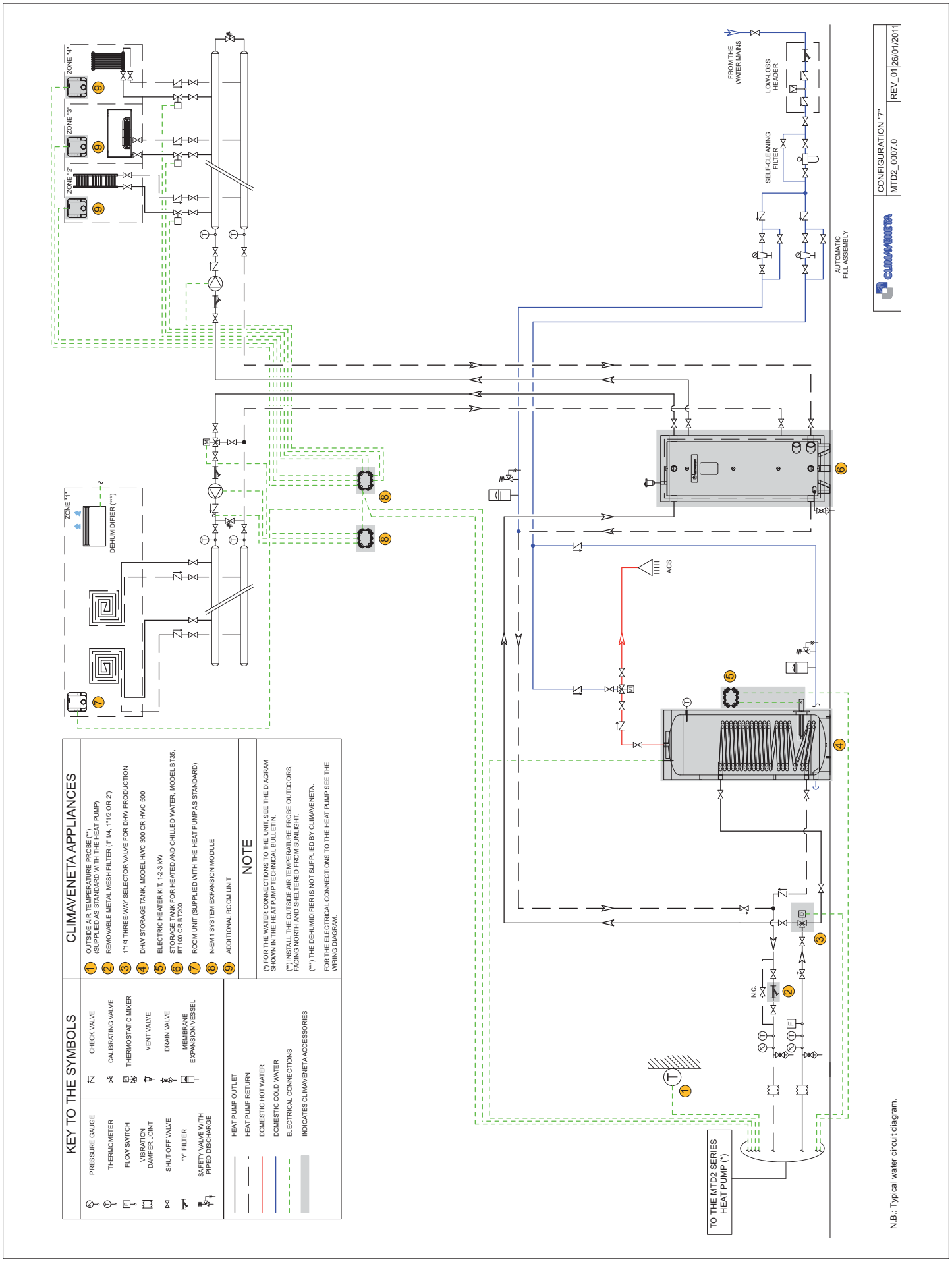
Configuration number 6 (parameter 0101= 6)


ZONE "3"
ZONE "2"
ZONE "1"
DEHUMIDIFIER (**)
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
CONFIGURATION "6"
MTD2_0006.0
REV_01 26/01/2011
TO THE MTD2 SERIES HEAT PUMP (*)
N.C.
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
HOT WATER RECIRCULATION
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
1 OUTSIDE AIR TEMPERATURE PROBE (**) (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
9 ADDITIONAL ROOM UNIT
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.
(***) THE DEHUMIDIFIER IS NOT SUPPLIED BY CLIMAVENETA.
FOR THE ELECTRICAL CONNECTIONS TO THE HEAT PUMP SEE THE WIRING DIAGRAM.

N.B.: Typical water circuit diagram.

Water circuit diagram

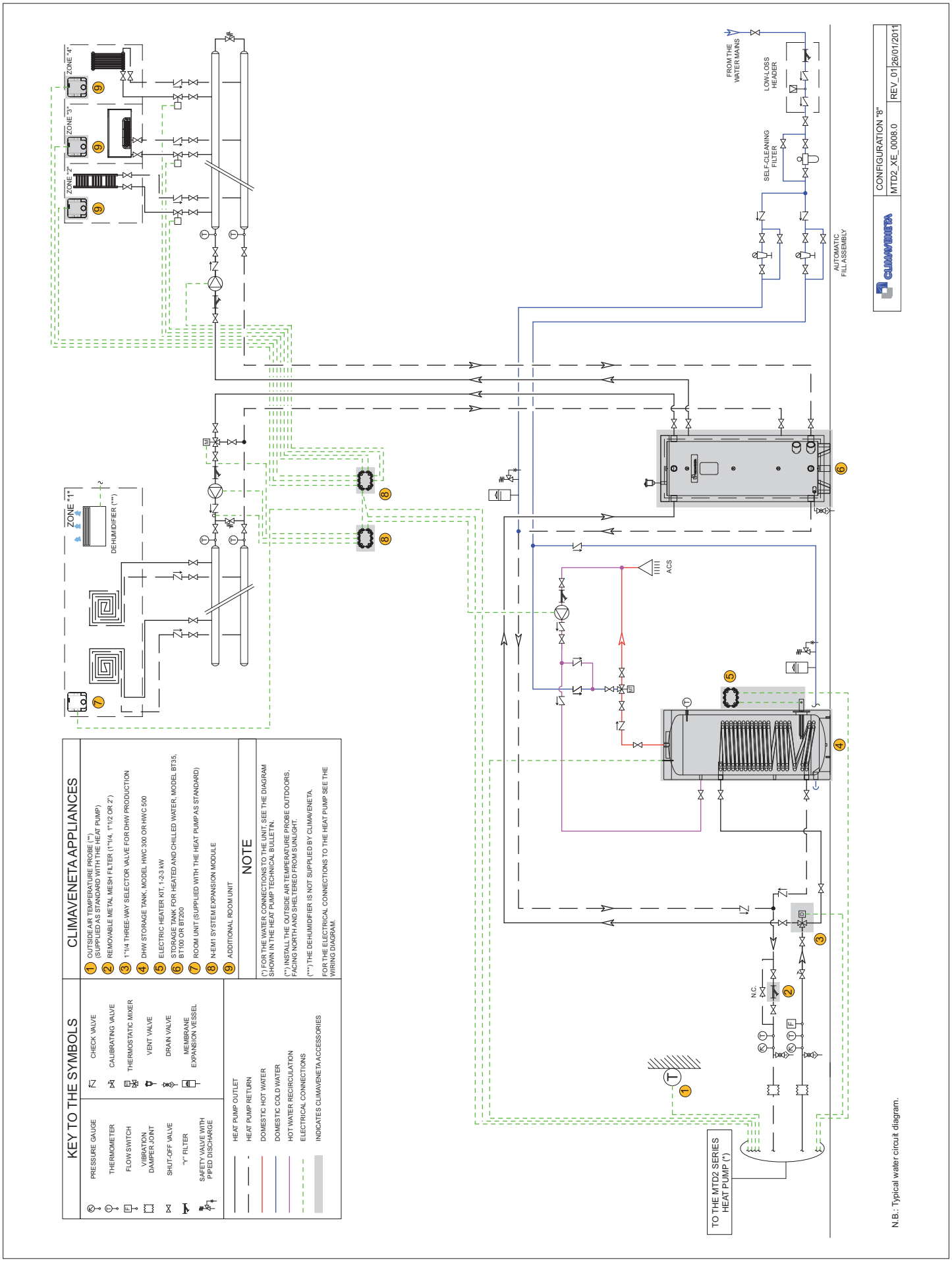
Configuration number 7 (parameter 0101= 7)


CONFIGURATION "7"
MTD2_0007.0
REV_01|26/01/2011
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "4"
ZONE "3"
ZONE "2"
ZONE "1"
DEHUMIDIFIER (***)
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
1 OUTSIDE AIR TEMPERATURE PROBE (**) (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-BM 1 SYSTEM EXPANSION MODULE
9 ADDITIONAL ROOM UNIT
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.
(***) THE DEHUMIDIFIER IS NOT SUPPLIED BY CLIMAVENETA. FOR THE ELECTRICAL CONNECTIONS TO THE HEAT PUMP SEE THE WIRING DIAGRAM.

N.B.: Typical water circuit diagram.

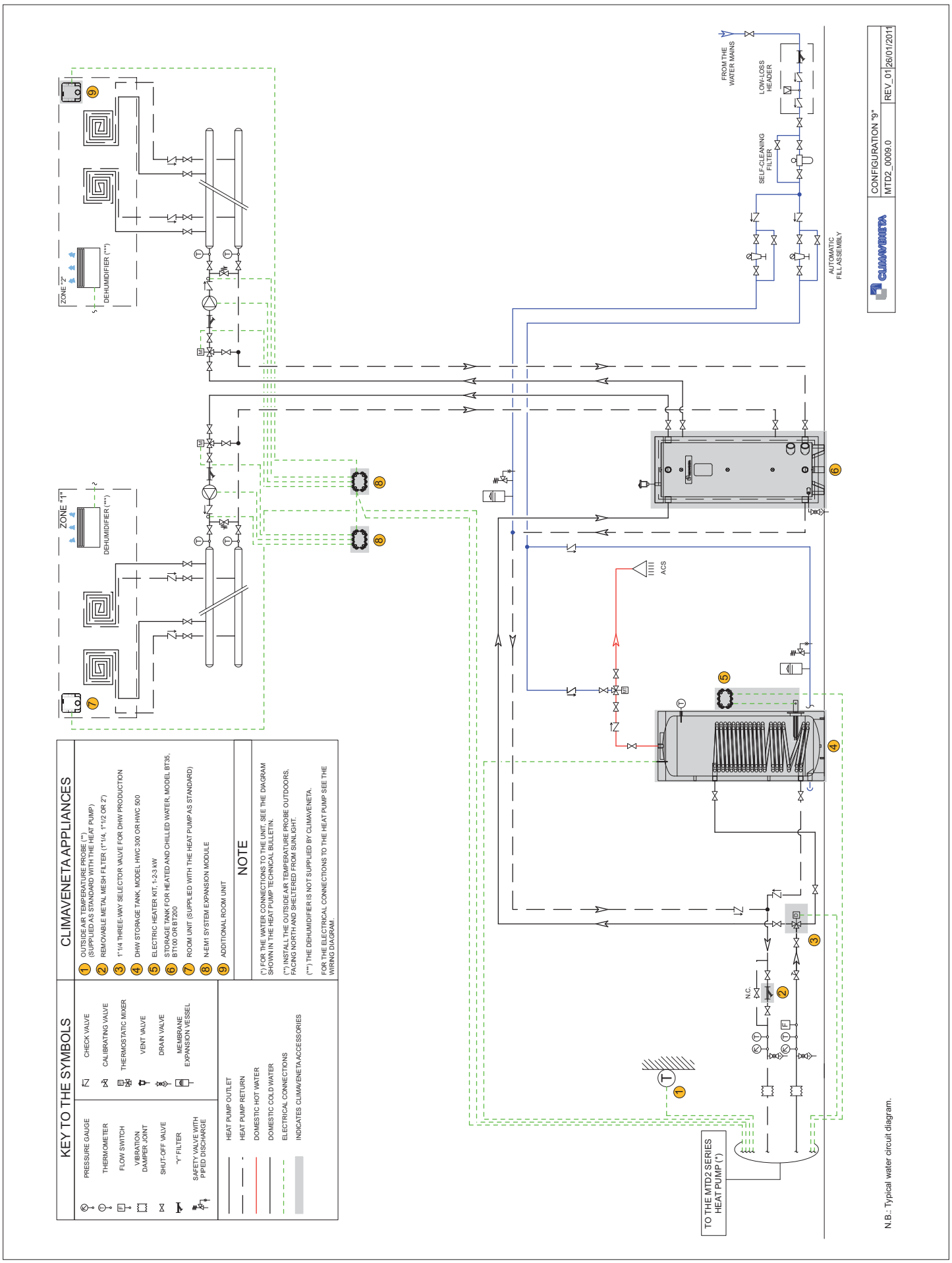
Water circuit diagram

Configuration number 8 (parameter 0101= 8)


CONFIGURATION "8"
MTD2_XE_0008.0
REV_01|26/01/2011
CLIMAVENETA
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "4"
ZONE "3"
ZONE "2"
ZONE "1"
DEHUMIDIFIER (***)
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
N.B.: Typical water circuit diagram.
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
HOT WATER RECIRCULATION
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
1 OUTSIDE AIR TEMPERATURE PROBE (*) (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
9 ADDITIONAL ROOM UNIT
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.
(***) THE DEHUMIDIFIER IS NOT SUPPLIED BY CLIMAVENETA. FOR THE ELECTRICAL CONNECTIONS TO THE HEAT PUMP SEE THE WIRING DIAGRAM.

Water circuit diagram

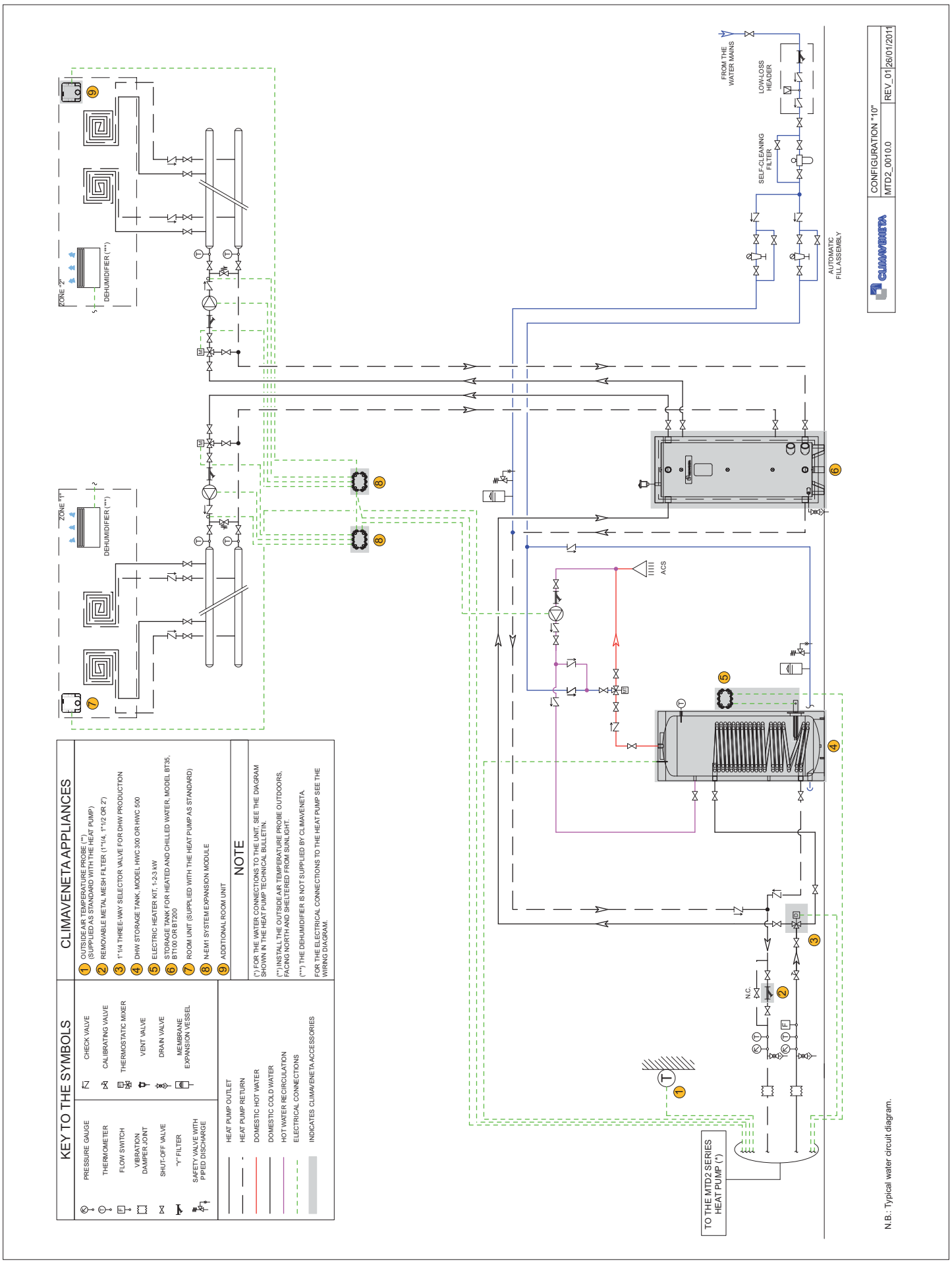
Configuration number 9 (parameter 0101= 9)


CONFIGURATION "9"
MTD2_0009.0
REV_01 26/01/2011
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "2"
DEHUMIDIFIER (***)
ZONE "1"
DEHUMIDIFIER (***)
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
1 OUTSIDE AIR TEMPERATURE PROBE (*) (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
9 ADDITIONAL ROOM UNIT
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.
(***) THE DEHUMIDIFIER IS NOT SUPPLIED BY CLIMAVENETA.
FOR THE ELECTRICAL CONNECTIONS TO THE HEAT PUMP SEE THE WIRING DIAGRAM.

N.B.: Typical water circuit diagram.

Water circuit diagram

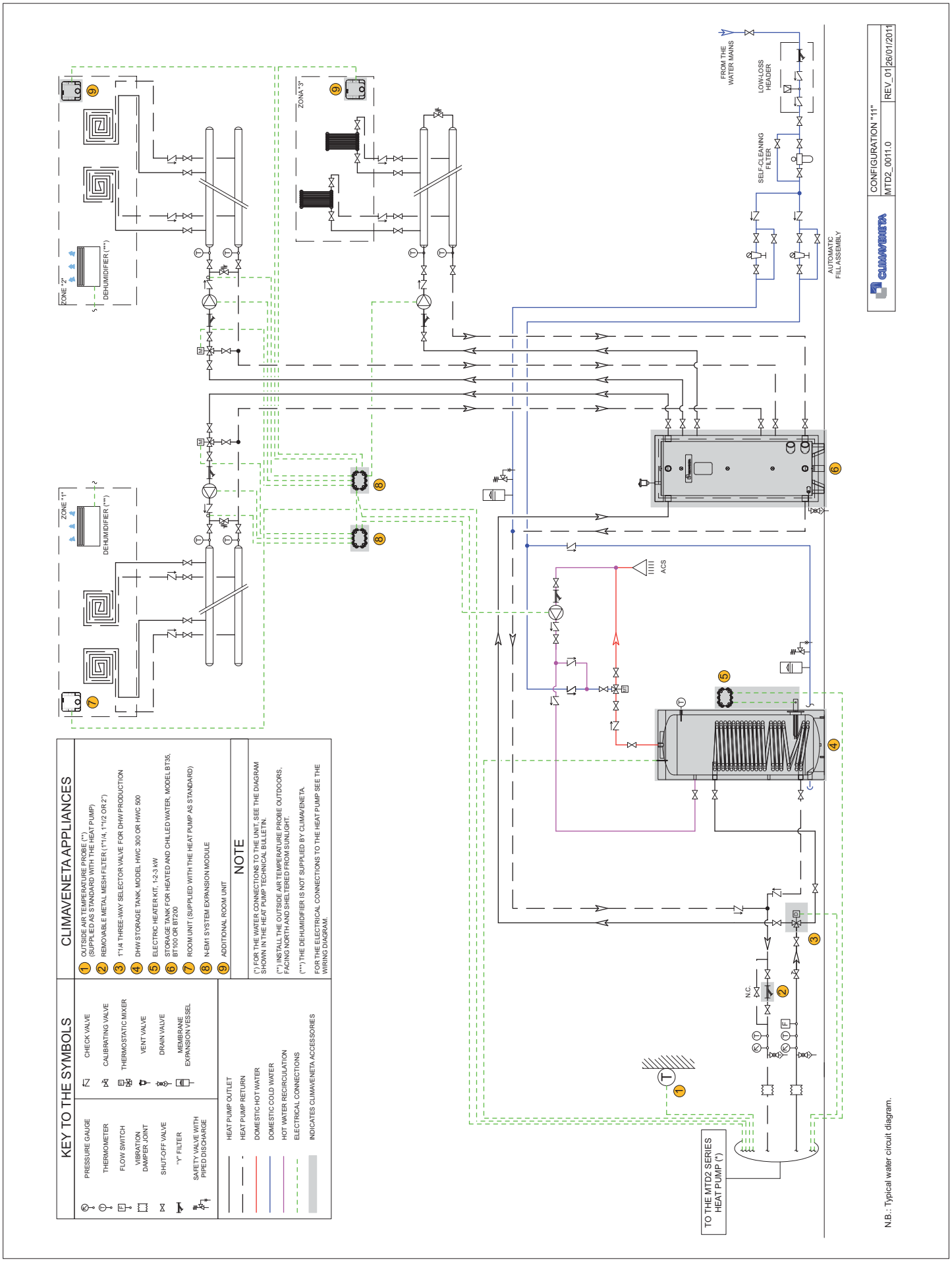
Configuration number 10 (parameter 0101= 10)


CONFIGURATION "10"
MTD2_0010.0
REV_01 26/01/2011
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "2"
DEHUMIDIFIER (***)
ZONE "1"
DEHUMIDIFIER (***)
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
HOT WATER RECIRCULATION
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
1 OUTSIDE AIR TEMPERATURE PROBE (*) (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
9 ADDITIONAL ROOM UNIT
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.
(***) THE DEHUMIDIFIER IS NOT SUPPLIED BY CLIMAVENETA. FOR THE ELECTRICAL CONNECTIONS TO THE HEAT PUMP SEE THE WIRING DIAGRAM.

N.B.: Typical water circuit diagram.

Water circuit diagram

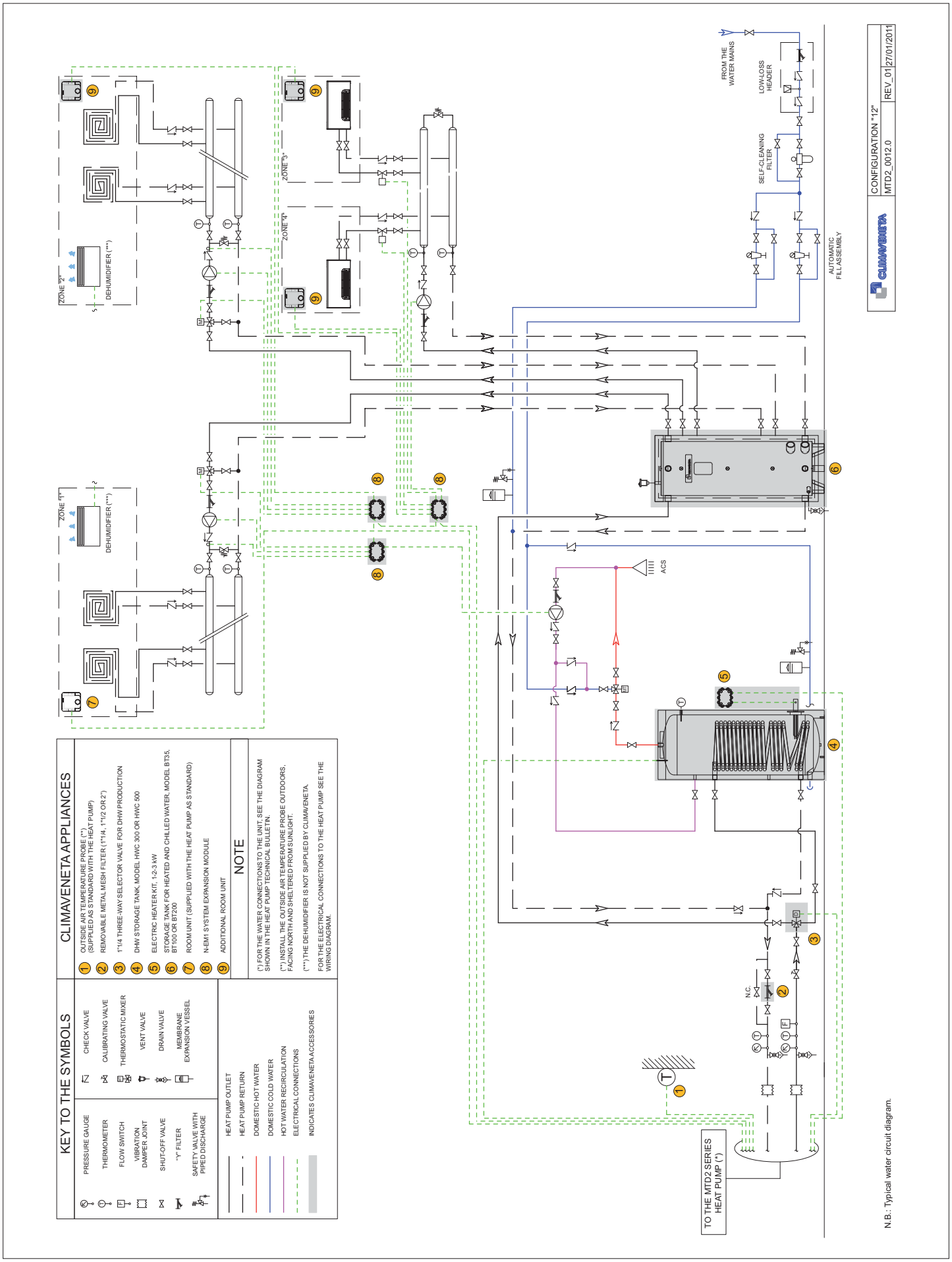
Configuration number 11 (parameter 0101= 11)


CONFIGURATION "11"
MTD2_0011.0
REV_01 26/01/2011
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "3"
ZONE "2"
ZONE "1"
DEHUMIDIFIER (***)
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
HOT WATER RECIRCULATION
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
1 OUTSIDE AIR TEMPERATURE PROBE (**) (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
9 ADDITIONAL ROOM UNIT
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.
(***) THE DEHUMIDIFIER IS NOT SUPPLIED BY CLIMAVENETA.
FOR THE ELECTRICAL CONNECTIONS TO THE HEAT PUMP SEE THE WIRING DIAGRAM.

N.B.: Typical water circuit diagram.

Water circuit diagram

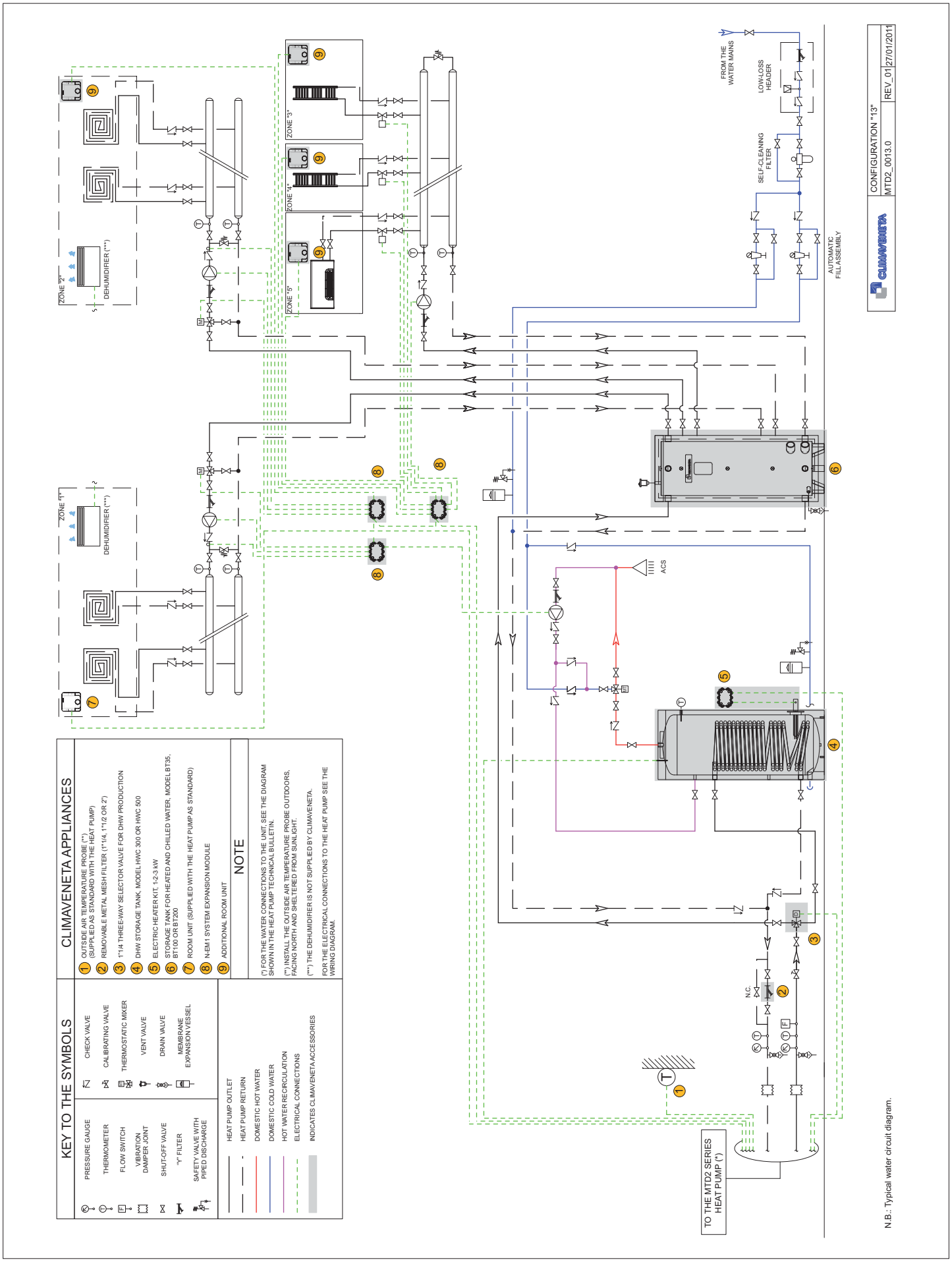
Configuration number 12 (parameter 0101= 12)


CONFIGURATION "12"
MTD2_0012.0
REV_01 27/01/2011
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "2"
DEHUMIDIFIER (***)
ZONE "3"
ZONE "4"
ZONE "1"
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
HOT WATER RECIRCULATION
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
1 OUTSIDE AIR TEMPERATURE PROBE (**) (SUPPLIED AS STANDARD WITH THE HEAT PUMP)
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL B135, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
9 ADDITIONAL ROOM UNIT
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.
(***) THE DEHUMIDIFIER IS NOT SUPPLIED BY CLIMAVENETA.
FOR THE ELECTRICAL CONNECTIONS TO THE HEAT PUMP SEE THE WIRING DIAGRAM.

N.B.: Typical water circuit diagram.

Water circuit diagram

Configuration number 13 (parameter 0101= 13)


CONFIGURATION "13"
MTD2_0013.0
REV_01 27/01/2011
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "2"
DEHUMIDIFIER (***)
ZONE "3"
ZONE "4"
ZONE "5"
ZONE "1"
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
HOT WATER RECIRCULATION
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
CLIMAVENETA APPLIANCES
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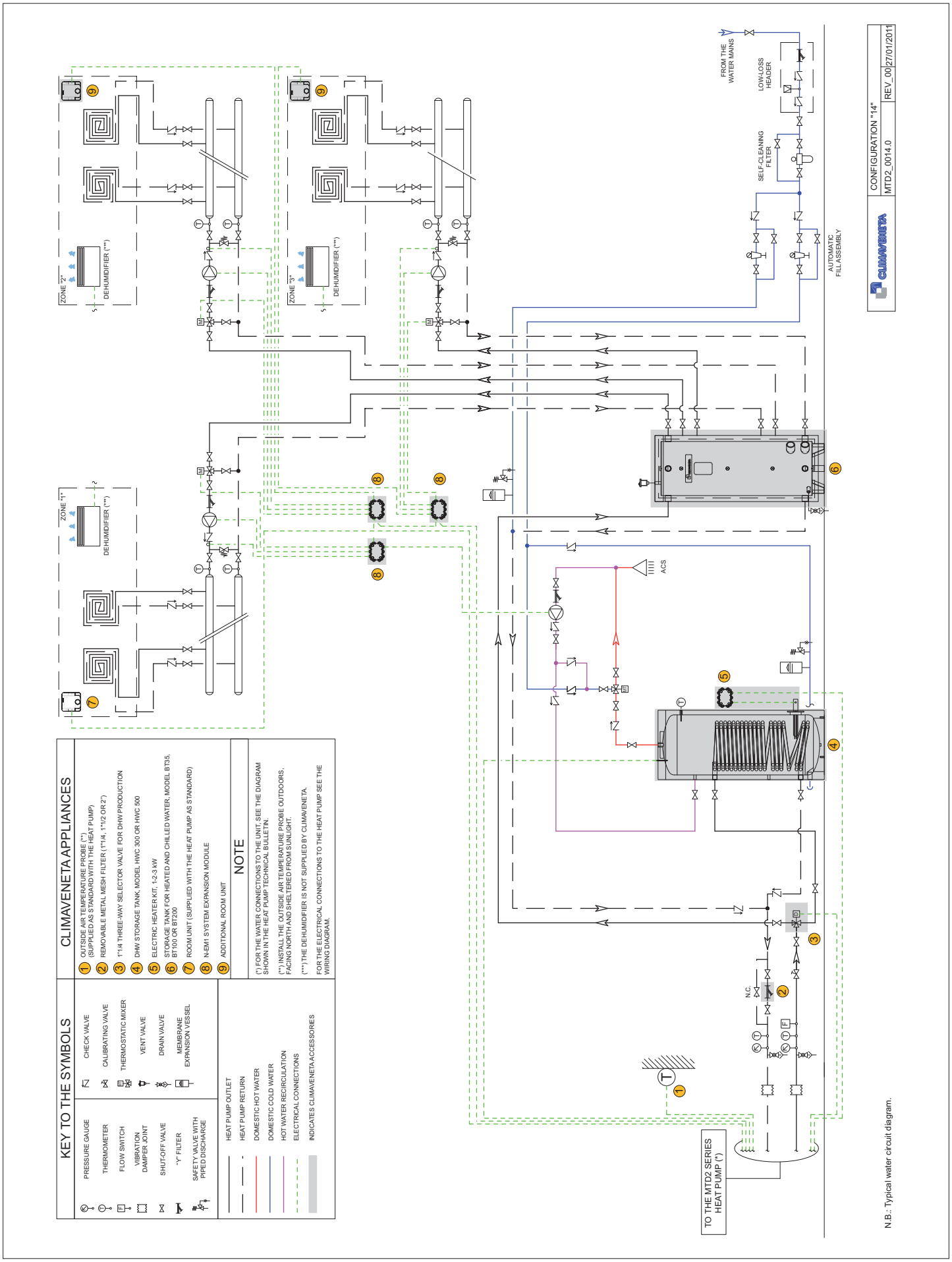
2 REMOVABLE METAL MESH FILTER (1"1/4, 1"1/2 OR 2")
3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
9 ADDITIONAL ROOM UNIT
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT, SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.
(***) THE DEHUMIDIFIER IS NOT SUPPLIED BY CLIMAVENETA. FOR THE ELECTRICAL CONNECTIONS TO THE HEAT PUMP SEE THE WIRING DIAGRAM.

N.B.: Typical water circuit diagram.

Water circuit diagram

Configuration number 14 (parameter 0101= 14)


CONFIGURATION "14"
MTD2_0014.0
REV_00 27/01/2011
FROM THE WATER MAINS
LOW-LOSS HEADER
SELF-CLEANING FILTER
AUTOMATIC FILL ASSEMBLY
ZONE "2"
ZONE "3"
ZONE "1"
DEHUMIDIFIER (**)
ACS
N.C.
TO THE MTD2 SERIES HEAT PUMP (*)
KEY TO THE SYMBOLS
PRESSURE GAUGE
THERMOMETER
FLOW SWITCH
VIBRATION DAMPER JOINT
SHUT-OFF VALVE
"Y" FILTER
SAFETY VALVE WITH PIPED DISCHARGE
CHECK VALVE
CALIBRATING VALVE
THERMOSTATIC MIXER
VENT VALVE
DRAIN VALVE
MEMBRANE EXPANSION VESSEL
HEAT PUMP OUTLET
HEAT PUMP RETURN
DOMESTIC HOT WATER
DOMESTIC COLD WATER
HOT WATER RECIRCULATION
ELECTRICAL CONNECTIONS
INDICATES CLIMAVENETA ACCESSORIES
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3 1"1/4 THREE-WAY SELECTOR VALVE FOR DHW PRODUCTION
4 DHW STORAGE TANK, MODEL HWC 300 OR HWC 500
5 ELECTRIC HEATER KIT, 1-2-3 kW
6 STORAGE TANK FOR HEATED AND CHILLED WATER, MODEL BT35, BT100 OR BT200
7 ROOM UNIT (SUPPLIED WITH THE HEAT PUMP AS STANDARD)
8 N-EM1 SYSTEM EXPANSION MODULE
9 ADDITIONAL ROOM UNIT
NOTE
(*) FOR THE WATER CONNECTIONS TO THE UNIT SEE THE DIAGRAM SHOWN IN THE HEAT PUMP TECHNICAL BULLETIN.
(**) INSTALL THE OUTSIDE AIR TEMPERATURE PROBE OUTDOORS, FACING NORTH AND SHELTERED FROM SUNLIGHT.
(***) THE DEHUMIDIFIER IS NOT SUPPLIED BY CLIMAVENETA.
FOR THE ELECTRICAL CONNECTIONS TO THE HEAT PUMP SEE THE WIRING DIAGRAM.

N.B.: Typical water circuit diagram.

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